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FORTY-SECOND ANNUAL REPORT

OF THE

DEPARTMENT OF MARINE AND FISHERIES

1909

MARINE

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

PRINTED BY C. H. PARMELEE, PRINTER TO THE KING'S MOST
EXCELLENT MAJESTY

1909

[1901-1910] Price, 20 cents.

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To His Excellency the Right Honourable SIR ALBERT HENRY GEORGE, EARL GREY,
VISCOUNT HOWICK; BARON GREY OF HOWICK; A BARONET, G.C.M.G., &C., &C.,
&C., &C., Governor General of Canada.

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith for the information of Your Excellency and the Parliament of Canada, the Forty-Second Annual Report of the Department of Marine and Fisheries, Marine Branch.

I have the honour to be,

Your Excellency's most obedient servant,

LOUIS-PHILIPPE BRODEUR,
Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,
OTTAWA, September, 1909.

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REPORT

OF THE

DEPUTY MINISTER OF MARINE AND FISHERIES

To the Honourable LOUIS-PHILIPPE BRODEUR,
Minister of Marine and Fisheries.

SIR,—I have the honour to report on the transactions of the Marine Branch of the Department of Marine and Fisheries for the fiscal year ending March 31, last.

The various branches were employed in the maintenance of aids to the navigation of Dominion waters, the construction of lights and fog signal towers, the establishment of other new aids and the improvement and repairs to the old. Hydrographic and tidal surveys were continued and new charts and tide tables issued. New lanterns and new types of lighting apparatus were substituted for older kinds; additional gas and signal buoys and sub-marine signals were put in position. Applications for new aids from the shipping interests received attention so far as the parliamentary appropriations would permit and the actual needs of navigation required. The local superintendence of the service by agents of the department as well as other outside officers was as usual performed. The general supervision of the service at Ottawa involved the issuing of directions and authority necessary in carrying on the operations of the department. The work of superintending and delivering supplies to light stations, attending the buoy service and conveyance of material for construction and repairs of towers, engaged the steamers and crews under the control of the department.

Winter communication between Prince Edward Island and the mainland and at River Ouelle and Murray bay, on the St. Lawrence river, was maintained without any interruptions. Icebreaking on the St. Lawrence river, at Cap Rouge, engaged the attention of the officers and crew of the *Montcalm* and the immense accumulation of ice at the point was successfully broken up and carried down by the current. The contracts for icebreaking at Fort William, Port Arthur, Collingwood, Midland and Depot Harbour, were carried out.

The work in the ship channel of the St. Lawrence river progressed satisfactorily and construction and repairs of steamers, dredges, tugs and barges at the Sorel shipyard proceeded in the usual way. Inspection of steamboats, live stock shipments and other cargo, was performed. Certificates were issued to marine engineers and masters and mates and medical attendance given at marine hospitals and by port physicians to sick mariners. Wireless telegraphy and meteorological stations were increased and the services improved generally.

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The contracts for the construction of an icebreaking steamer for service between Prince Edward Island and the mainland and for a steamer for supply and buoy service above Montreal and Georgian bay, are being carried out.

In my report will be found summaries of reports of the officers of the department, but the reports themselves form appendices.

The Subdivisions of the Marine Branch and the expenditure in connection therewith are as follows:—

The construction of lighthouses and fog alarms.

The maintenance of lights, gas buoys and other buoys.

The lighthouse board, which decides the necessity for aids to navigation.

The hydrographic surveys.

The tidal surveys.

The ship channel St. Lawrence river and Sorel works.

Meteorological and magnetic service.

Investigations into wrecks.

Board of steamboat inspection.

Cattle shipments inspection.

Wireless telegraph service.

Signal service.

Life-saving service.

Marine hospitals.

Submarine signals.

Shipping under the Merchants Shipping Act.

Legislation and administration of laws relating to the Department of Marine and Fisheries.

Humane service in connection with seamen.

Wrecking plant subsidized.

Winter communication.

Removal of obstructions to navigation.

Examination of masters and mates and issuing certificates.

Naval militia.

Pilotage.

Government of ports and proclaiming of harbours in the Dominion.

Control of harbours and government wharfs.

Dominion steamers, Marine and Fisheries.

Hudson bay and navigation of northern waters.

APPROPRIATIONS AND EXPENDITURE.

OCEAN AND RIVER SERVICE.

Appropriation.. . . .	\$1,327,800 00
Expenditure.. . . .	1,201,804 76
Expenditure less than appropriation.. . . .	\$ 125,995 24

PUBLIC WORKS CHARGEABLE TO CAPITAL.

Appropriation.. . . .	\$1,110,500 00
Expenditure.. . . .	963,784 58
Expenditure less than appropriation.. . . .	\$ 146,715 42

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LIGHTHOUSE AND COAST SERVICE.

Appropriation.. . . .	\$3,008,100 00
Expenditure.. . . .	2,721,801 58
Expenditure less than appropriation.. . . .	\$ 286,298 42

SCIENTIFIC INSTITUTIONS AND HYDROGRAPHIC SURVEYS.

Appropriation.. . . .	\$ 392,250 00
Expenditure.. . . .	296,579 30
Expenditure less than appropriation.. . . .	\$ 95,670 70

MARINE HOSPITALS AND SHIPWRECKED AND DISABLED SEAMEN.

Appropriation.. . . .	\$ 58,000 00
Expenditure.. . . .	56,993 87
Expenditure less than appropriation.. . . .	\$ 1,006 13

STEAMBOAT INSPECTION AND FOG ALARMS.

Appropriation.. . . .	\$ 51,100 00
Expenditure.. . . .	41,226 47
Expenditure less than appropriation.. . . .	\$ 9,873 53

CIVIL GOVERNMENT SALARIES MARINE AND FISHERIES.

*Expenditure.. . . .	\$ 163,222 36
Appropriation.. . . .	122,250 00
Expenditure more than appropriation.. . . .	\$ 40,972 36

CONTINGENCIES.

Appropriation.. . . .	\$ 21,150 00
Expenditure.. . . .	20,320 92
Expenditure less than appropriation.. . . .	\$ 829 08

MISCELLANEOUS.

	Appn.	Ex.
To repay A. Cushing & Co., re seizure of schooner <i>Evolution</i> in 1893.. . . .	\$ 800 00	\$ 800 00
Investigation Marine and Fisheries Department.. . . .	55,000 00	31,316 90
Returns to parliament.. . . .	500 00	681 02
	<u>\$56,300 00</u>	<u>\$32,797 92</u>
	32,797 92	
Expenditure less than appropriation.. . . .	\$23,502 08	

* NOTE.—A number of outside officers that were previously paid out of separate votes were transferred and paid out of civil government from September 1, 1908.

Total appropriation, Fisheries Branch, not including civil government and fisheries bounty.. . . .	\$1,324,900 00
Total expenditure same branch.. . . .	791,728 69
Expenditure less than appropriation.. . . .	\$ 533,171 31
Grand total appropriation.. . . .	\$7,472,350 00
Grand total expenditure.. . . .	6,290,260 45
Grand total expenditure less than appropriation.. . . .	\$1,182,089 55

The statement of expenditure in detail is Appendix No. 5 to this report.

LIGHTHOUSE SERVICE.

The lighthouse service of the Dominion is divided as follows:—The Ontario division, embracing all lights from Montreal westward to the Northwest Territories; the Quebec division, extending below Quebec and including the St. Lawrence river from Platon, the Gulf of St. Lawrence and Strait of Belle Isle, Cape Ray, and Cape Anguille, Newfoundland; the Montreal division, including the St. Lawrence river from Montreal to Platon; the Nova Scotia division, including St. Paul's island, Sable island and Cape Race, Newfoundland; the New Brunswick division, the Prince Edward Island division and British Columbia division, each including lights within the provincial boundaries.

The lighthouse construction service under the chief engineer includes the preparation of plans, draughting of specifications, locating of light and fog alarm stations and construction of all buildings connected therewith. Personal inspection is made by the Chief Engineer or his assistants and by district engineers. Notices to mariners are issued by this branch giving to mariners the exact location, latitude and longitude of stations, the kind and order of lights established, also prompt notice of accidents or changes in lights. Similar notices are issued in connection with all aids to navigation. During the past year 127 notices were issued covering 321 cases of improvements and establishment of new aids.

During the past year, twenty-seven new lighthouses, thirteen fog alarms and two acetylene beacons, were established.

The total number of light stations, separate fog alarm stations and lightships in the Dominion is 968; lights attached to these stations 1,193; steam fog horns, bells and fog guns, 123; the lightkeepers and engineers of fog-alarms according to the pay-lists number 921; gas buoys, 234; whistling buoys, 23; bell buoys, 57; submarine bells, 9.

Eight new lights were established in Nova Scotia; three in New Brunswick; eight in Quebec and eight in Ontario.

The chief engineer's report relating to lighthouse construction, repairs, tidal and hydrographic surveys, &c., contains information relating to these subjects in detail.

Ice breaking at Collingwood, Midland and Depot Harbour, Georgian Bay, and in the approaches to Fort William and Port Arthur in Lake Superior, was performed in connection with this branch. A report of the work done appears in the chief engineer's report. The same report contains details of removal of obstructions to navigation and the cost. The principal repairs to stations and improvements as well as the

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establishment of new aids are subjects reported upon and some account given in detail. The report of the inspector of fog-alarms is appended to the chief engineer's report.

Among the subjects receiving special attention was the construction of reinforced concrete towers and increase of standard diaphones which have proved so successful as fog-signals. The tidal surveys and the report of the officer in charge, enumerating the tide tables so far prepared, and the effect of currents in the waters surveyed, is also contained in the chief engineer's report. The plans, specifications and other work done in the drafting room are stated in an 'inclosure' accompanying his report. It will be seen that descriptions of lights and other aids and sailing directions requiring special care in the compilation are mentioned.

Agents at Halifax, St. John, Charlottetown, Quebec and Victoria as usual, directed the delivery of material for repairs and lighthouse supplies, consisting of illuminating oil, paint, paint oil, coal for fog-alarms, brooms, buckets, soap, matches, towels and other necessary articles for maintaining and keeping the lighthouses clean. The supplies were delivered by the Dominion steamers under the supervision of the superintendents of each agency who reported to the agents and the agents to the department. The superintendent of lights above Montreal whose district includes Ontario has his office in the department at Ottawa, and reported directly. The steamer *Neepawah* was chartered for the delivery of supplies in 1908, to the lights above Montreal, but while on her trip ran ashore in a fog near Peninsula harbour in Lake Superior. It was necessary to transfer the supplies to another boat to continue the trip to the remaining lighthouses.

In connection with the lighthouse service a new classification of lightkeepers' salaries was made to go into operation from April 1, 1908. Regulations have been published on this subject. The former practice of supplying lightkeepers with fuel, light, water, horse keep, &c., has been discontinued with the exception of at fog alarm stations, where keepers may heat their dwellings with fuel supplied the station.

The report of W. P. Anderson, chief engineer, form appendix No. 1 to this report.

ILLUMINANTS, ILLUMINATING APPARATUS AND GAS BUOYS.

In the report of the Commissioner of Lights will be found a detailed account of the work done in the light and buoy branch. This branch attends specially to lighting apparatus, warning and gas buoys and illuminants. The principal work performed has been the installation of lanterns and their attachments at new lighthouse stations, the substitution of modern dioptric apparatus in a number of major coast lights and the improvement of minor lights by the use of petroleum vapour as an illuminant, and the maintenance of lights throughout the Dominion.

The lighting apparatus now in use in the Dominion lighthouse service consists of lanterns, in which are operated distinctive lights known as quick flashing lights, occulting lights, fixed lights (red and white), anchor lenses for pole lights and a few Wigham 30 day lights. The reflector or catoptric apparatus is used for revolving and fixed lights. The illuminants used consist of oil, oil vapour, and acetylene (compressed and automatically generated) and pintsch gas.

The submarine bell service has given, during the year, excellent service. The improved bells introduced in the summer of 1907 have not required any attention with regard to readjustment. Four shore stations and five lightship stations are in

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successful operation, one accident only occurring and that to the cable at Negro Head, New Brunswick, which failed, requiring the cable to be raised and repaired. The submarine stations in operation are at Negro Head, Yarmouth and Lurcher lightship, all in the Bay of Fundy; Louisburg, Cape Breton; Chebucto Head, Nova Scotia; Anticosti lightship in the Gulf of St. Lawrence and White island, Red island and Prince shoal lightships in the St. Lawrence river.

The coast buoy service in each agency was carried out by the Dominion steamers, but it was necessary to charter the *Restigouche* in New Brunswick, and the *Joliffe* and *Cascade* in British Columbia also for this work.

From the Dominion lighthouse depot at Prescott, lighthouse apparatus was distributed throughout the Dominion. The stores consisting of lamps, burners, lenses, reflectors and other lantern attachments are kept in stock. The repair shops were kept occupied during the year and lighthouse apparatus of a special nature was manufactured. Photometric and other tests are made at the depot from time to time to determine the efficiency of modern apparatus and to establish comparisons between the older types and kinds and the new. Upon these comparisons is determined which are the effective optical appliances, mechanism and illuminants. In this connection an important advance has been made in the development of a revolving mercurial joint, which makes possible the use of petroleum vapour as an illuminant in conjunction with revolving reflectors. By this means a light of 48,000 candle power can be manufactured at a moderate cost. Diagrams showing a high power catoptric revolving light in a lantern 10 feet in diameter, and high pressure revolving joint will be found in the illustrations of this report and a description of the advance on the familiar mercurial seal, will be found in the Commissioner's report.

The buoy service in the St. Lawrence river between Kingston and Montreal has been conducted as usual by the steamers *Scout* and *Reserve*, having their headquarters at the Prescott depot. The buoys and moorings were stored in the yard and upon the docks at the depot during the winter where they received overhauling and repairs and were made ready for putting in position when navigation opens.

In the Parry Sound agency, work was performed in the maintenance of acetylene lights and the location of gas buoys in Georgian bay. The buoys were placed and taken up by the aid of a derrick scow and a chartered tug. The new dock has been used for storing buoys for the winter and for the work of overhauling and preparing the buoys for placing in position.

In British Columbia many changes and improvements were made in acetylene and other coast buoy service by the addition of new buoys. In this agency the new scow was an efficient aid in handling heavy buoys and moorings. The purchase of the steamer *Newington* for moving the scow and for other service, enabled the officers of that agency to accomplish much better work and more extensive operations than formerly. The rapid development of water traffic made the establishment of new aids necessary.

Five 'inclosures' accompany this report containing details by provinces of new aids to navigation and improvements in the lights for 1908-9; the number of light stations, lights, fog-alarms and warning buoys in operation; the number of gas buoys and gas buoy stations throughout the Dominion at which gas buoys were in service and an outline chart of the Atlantic coast of Canada showing quick flashing lights

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of the hyper-radial and first order, second order, third order, third order small model and fourth order in operation during the fiscal year 1908-9.

The report of the Commissioner of Lights forms Appendix number 2 of this report.

RIVER ST. LAWRENCE SHIP CHANNEL.

The report of Mr. V. W. Forneret for the superintending engineer of the work in the St. Lawrence river ship channel contains a short historical account of the improvements made in the ship channel since its commencement and showing the total expenditure to the end of the season of 1908 to be \$7,208,543.50 for dredging, and \$3,501,449.96 for plant, total \$10,709,993.46, and the total number of cubic yards dredged to be 61,767,292.

An outline of the projected work for the future shows the extent of dredging that will be required to complete the channel for the largest and deepest liners afloat. The national character of the project has long been recognized and the country has reaped the benefit from the amount of trade seeking an inlet and outlet by the St. Lawrence route. The rapid advance in the construction of vessels of the largest size engaged in ocean traffic and seeking the St. Lawrence route, will make a deeper channel imperative. The surest indication of the growing traffic, by large steamers, has been the establishment of several new lines of these vessels, some of which are the 10,000 and 15,000 ton ships that arrive at Montreal and leave day and night. These vessels after crossing the shortest track of the open ocean, have a sheltered waterway of 900 miles. The progress of deepening and widening the channel in certain localities, during the season of 1908, has been an important step in the continuous work towards carrying out the project between Montreal and Beaujeu bank below Quebec.

At the end of the season of 1908, there was a completed channel to a depth of 30 feet at extreme low water from Montreal to Cape Levrard, 4 miles below Batiscan, a distance of 104½ miles below Montreal. Below Batiscan, advantage is taken of the tide during low water season to obtain this depth to pass Cap à la Roche and St. Augustin bar. The available depth in the Cap à la Roche dredged channel is indicated by the St. Jean des Chaillons semaphore; this was put in operation for the season on June 17, 1908. The available depth over the undredged St. Augustin bar is indicated by the semaphore at St. Nicholas, which was started for the season on June 24, 1908. The datum adopted for low water is the stage of the lowest water in 1897 being the lowest on record for any season, but in the summer of 1908 the river was at low water. The depth in the channel, however, from Montreal to Batiscan was 30 feet and from Batiscan at extreme low tide it was the same. In the first part of the season the depth was from 36 to 42 feet. The water lowers in September and October; the highest water in 1908 was 42 feet 4 inches and the lowest 30 feet.

There has practically been no filling in of the ship channel since its commencement nor boulders and this has been ascertained by the practice of sweeping the channel. Mr. N. B. McLean, C.E., with an assistant, has been in charge of the sweeping plant, which consists of a twin-screw steamer and testing scow.

The work of deepening the St. Thomas channel, Quebec, was begun late in the autumn of 1907 and at the close of the season of 1908 good progress had been made. The St. Thomas flats consist of clay and sand and should be finished in about three or four years.

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The work remaining to be done in the length of the channel is the dredging of about two miles of shale rock at Cap à la Roche; about one mile at Grondines; about one mile at St. Augustin bar, also about one mile of widening at St. Croix and $5\frac{1}{2}$ miles of widening in Lake St. Peter. The widening in this lake will be completed, it is expected, in 1909; the work at Cap à la Roche will take from three to four years to finish. The dredged ship channel will then have a width, whole length, of 450 feet in the straight parts and from 500 to 750 feet at the bends, but at Beaujeu bank the width everywhere will be 1,000 feet and this part, it is expected, will be completed at the end of the season of 1909.

The plant available at present for work in the channel consists of two elevator dredges for soft clay, four for hard pan and shale rock; two hydraulic dredges for soft mud discharged by pipe; one sand pump hopper sea-going dredge; two stone lifters and a number of tugs, scows, &c. The sea-going hopper dredges are used below Quebec. An addition will be made to the plant by a large sized spoon dredge now under construction for the upper reaches of the river; a steel hull elevator dredge is authorized and a new stone lifter.

The marine signal service was especially useful during the latter part of the season of 1908 when so much fog and smoke prevailed. The smoke and fog were denser than at any previous time in the history of the work, causing suspension of operations for days at a time.

The annual inspection was made of the channel by the head of the department, being accompanied by a staff of the officers and the representatives of the Shipping Federation, Montreal Board of Trade, La Chambre de Commerce, the mayor of Quebec, representatives of the Montreal Harbour Commissioners and the Montreal and Quebec pilots. At the same time the inauguration of a new code of signals took place; the signals are to be used between stations and passing vessels, by flags in the day and lights at night.

Reference is made in the report of Mr. Forneret to the work of the *Montcalm*, in breaking and removing the ice bridge at Cap Rouge in the river, during the winter, enabling the ice to pass down with the current, causing the opening of navigation about three weeks earlier than would have been the case if naturally opened. The work of the *Montcalm* will form a separate subject of this report.

The report of the ship channel contains several carefully prepared tables showing in detail the amount of work performed. The dredges, tugs, scows, stone lifters, &c., needing extensive repairs during the summer were taken to the Sorel shipyard where the work was done. The whole plant, at the close of navigation, was put in winter quarters at the Sorel shipyard where the necessary overhauling and repairs, are now being completed and improvements made for next season's operations. The total number of yards dredged during the season, was 5,896,737 at a cost of \$479,686.03 or 8.44 cents per cubic yard.

The report on the ship channel work forms Appendix No. 3 of this report.

SOREL SHIPYARD.

The Sorel shipyard has been more immediately under the direction of Mr. L. G. Papineau, Assistant Director of the Shipyard. At the opening of the fiscal year, the yard was working to its fullest capacity completing repairs and improvements to the

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St. Lawrence ship channel fleet. As usual all the dredges, tugs, stone lifters and scows were overhauled and made ready for the commencement of work. There were six elevator dredges, three suction dredges, nine tugs, three twin screw wooden boats, two stone lifters, fifteen dumping scows, four coal barges, one floating shop for minor repairs, three scows with houses on them for lodging spare crews. In addition the following vessels belonging to other branches of the Marine and Fisheries service were overhauled and made ready for the season's work, viz.: the *Shamrock* and barge *Acetylene* of the maintenance of lights branch; the *La Canadienne* and *Maisonneuve* of the lighthouse service; the *Verchères*, *Hosanna* and *Alpha* employed in the construction of lights.

The new vessels under construction at the same time were dipper dredge No. 19; dredge No. 24; tug No. 22 for lighthouse work in the upper lakes and one floating shop; stone lifter, No. 20; lighthouse tender, No. 21. This tender is of steel, length 222 feet over all, beam, 34·8 feet, depth moulded 22 feet, draught 15 feet, speed to be 11½ knots with triple expansion engines. The other construction was two flat scows 63 feet by 27 feet 8 inches; two dumping scows of a capacity of 200 cubic yards; construction No. 29, a wooden tug of light draft and construction, No. 30, a derrick scow for work on the Ottawa river.

Tug No. 22 was launched and named the *Lambton*, this vessel was about completed at the end of the fiscal year for work on the upper lakes; dipper dredge, No. 19, was launched in July and at the end of the fiscal year most of the machinery had been installed. The floating shop was completed and put in service in the ship channel in August, 1908.

During the summer the following vessels were hauled out on the slipway, viz.: the *De Lévis* for minor repairs, dredge No. 3 for extensive repairs, damage due to an accident; the tug *Jessie Hume* for painting and securing iron sheeting; the tug *Montcalm*, tug *Hosanna*, scow No. 9, tug *Alpha*, scow No. 14, tug *Ottawa*, tug *Reserve*, tug *Champlain*, tug *Emilia*, scow of St. Ours lock, tug *Frontenac*, tug *Verchères*, scow No. 10, and barge *Acetylene*, for repairs to propellers, rudders, shafting or hulls. In addition the *Lady Grey*, *Maisonneuve*, *International* (of the Public Works Department) and the *Constance* had repair work done. The last mentioned steamer had a new boiler built and installed. Three lightships wintered at the yard and were painted.

Work for other departments is often done at the Sorel shipyard; the stone lifter of the Public Works Department was repaired.

Ordinary repairs were made to the buildings of the yard but building No. 4 had alterations which increased the space for offices; a set of powerful bending rollers was added to the plant, capable of bending boiler plate 1½ inches thick 14 feet in diameter and 12 feet 6 inches wide. Thirteen buildings were painted.

About 2,000 feet of new track were added to the shipyard narrow gauge railway, six new switches and two right angle crossings were made. Wharf No. 4 was enlarged by filling in at the rear.

Four new buildings were erected in the course of the year; one known as No. 22—50 by 32 feet with a plank platform 100 feet by 36, is a storehouse for castings; No. 23, is a dry kiln with two compartments, 60 by 18 feet; No. 20, used for storing dry lumber; No. 21, is a boiler room for heating the drying kiln, saw-mill, paint shop, asbestos shop and mould loft.

Seven hundred feet of main line pipe for water works was laid and four hydrants were placed and an earthenware drain pipe was laid for draining between the mould loft, drying kiln and lumber store.

The force employed varied from 623 to 920, average number of workmen was 729. The financial statement included in the report of the assistant director of the yard shows the expenditure to the end of March, 1909, to have been \$1,132,279.40. The report forms Appendix No. 4, of this report.

BUOYS AND BEACONS.

The buoys and beacons include those beacons which are not enumerated in the list of lights.

New buoys of several kinds were placed during the year. These buoys consisted of lighted buoys of different sizes and types, automatic whistling, bell, conical, spherical, can, platform, spars and barrel buoys. The highest type of buoy is the gas whistling and bell buoy, which shows its light a great distance and in thick and foggy weather is an effective warning buoy. Several gas and whistling buoys and several gas and bell buoys, were added to the number already in position on the Atlantic and Pacific coasts. The substitution of gas lighted buoys for unlighted buoys in many localities has taken place. This work has involved an increased expenditure. The total expenditure for buoy service for the Dominion during the fiscal year was \$161,838.25. The contract system for maintaining the small buoys in the numerous bays, inlets, rivers, lakes and harbours has been found to work most economically but not always as efficiently as desired. The inspection was performed by harbour masters in each locality and a general inspection was made by the inspectors of buoys or agents in each province.

Two derrick scows have been added to the equipment for handling heavy buoys, one in British Columbia and one in Georgian bay. These scows have been valuable auxiliaries in placing and taking up buoys and are towed by steamer or tug.

The expenditure in connection with each province for the fiscal year, was as follows:—

Nova Scotia.. . . .	\$ 31,038 04
New Brunswick.. . . .	27,496 10
Quebec.. . . .	53,733 01
Ontario.. . . .	19,242 16
British Columbia.. . . .	26,969 93
Prince Edward Island.. . . .	3,359 01

\$161,838 25

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List of Buoys maintained by the Department of Marine and Fisheries in Canadian Waters in 1908.

ONTARIO.

	No. of Buoys.		No. of Buoys.
Amherstburg, including Bois Blanc..	46	Pointe au Baril, beacons..	15
Bay of Quinte (two contracts)...	19	Pointe au Baril, buoys..	4
Bear's Rump..	1	Penetanguishene..	4
Big Duck island, bell buoy..	1	Port Arthur, gas buoys..	3
Blind River..	4	Port Rowan..	12
Byng inlet..	7	Rainy River, beacons, pairs..	11
Collingwood..	15	Rainy River, buoys..	14
Clapperton channel..	9	River Thames, gas buoy..	1
Georgian Bay..	13	River Thames, buoys..	8
Georgian Bay gas buoys..	8	Rondeau..	6
Green shoal..	1	St. Lawrence river, Montreal to King-	
Goderich..	5	ston, spars..	
Goderich, gas-buoy..	1	St. Lawrence River, Montreal to King-	
Gananoque, gas buoys..	3	ston, can buoys..	
Hawkesbury..	15	St. Lawrence River, Montreal to Tren-	
Kaministiquia..	9	ton, and above, gas buoys..	45
Lake Erie, gas buoys..	4	Sault Ste. Marie..	21
Lake of the Woods, including bell		Sault Ste. Marie, canal approaches..	25
buoys..	115	Sault Ste. Marie, gas buoys..	2
Lake Simcoe..	5	Seine River and Grassy lake, piles..	30
Lake Superior, including bell buoy..	8	Seine river, buoys..	10
Little Current..	8	South Baymouth..	4
Lone Rock, gas and bell buoy..	1	Stokes Bay..	6
Midland..	7	Sturgeon bar, gas buoy..	1
Murray Canal and Presqu'île bay..	23	Temagami lake, 4 beacons and..	31
Lake Temiskaming..	3	Thenton..	13
Napanee..	14	Victoria island, Lake Superior..	3
Niagara, bell buoy..	1	Waubashene..	37
North Sisters rock..	4	Winnipeg river..	13
Orillia..	18	Saugeen river..	9
Pancake shoal, bell buoy..	1	Sturgeon river..	26
Parry Sound..	24	St. Clair river, gas buoy..	1
Campbells rock..	1	Sarnia, gas buoy..	1
Pembroke..	23	Southampton, gas buoy..	1

QUEBEC.

Agnes..	1	Lake St. John—	
Amherst harbour..	8	River Ashuapmuchuan..	
Anse à Gascons..	1	River Mistassini..	
Anse à Beaufils..	1	River Peribonka..	
Barachois de Malbaie..	1	Roberval harbour..	
Bonaventure..	9	25 beacons and..	110
Cap Chat..	1	Little river east..	1
Cape Cove..	1	Lachine rapids..	7
Cap Meule..	1	Maria..	1
Carleton point..	1	Matane..	3
Chicoutimi..	15	Mont Louis..	1
Cock point..	1	New Richmond..	3
Chaudière basin..	7	North channel, Island of Orleans..	10
Cape Despair..	1	Nouvelle..	2
Douthe's point..	1	Paspebiac..	1
English bay..	3	Pentecost..	1
Eschourie rock..	1	Percé..	2
Fox river..	1	Port Daniel..	1
Gaspé..	6	Portneuf..	9
Grand Entry..	17	Restigouche river..	10
Griffin Cove..	1	Restigouche river, gas buoys..	6
Gros Cap-aux-Os..	1	Richelieu river, balises..	
House harbour, Magdalen islands..	7	Little river, west..	1
Lake Temiskaming, viz:—		Petit Rocher..	2
Schooner island..	3	Richelieu river, St-Antoine to Chambly	35
Opemigon Narrows..	4	Richelieu river, above St. Johns..	21
Montreal river..	3	Rigaud river..	7
North Temiskaming..	9	Rivière à la Pipe, Lake St. John..	8
Couverette's Camp..	1	Rivière des Prairies..	10
Brown's Point..	1	Ste. Adelaide de Pabos..	1
		Ste. Anne river..	1

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LIST of Buoy maintained by the Department of Marine and Fisheries, &c.—*Con.*QUEBEC—*Con.*

	No. of Buoys.		No. of Buoys.
St. Thomas.. . . .	8	Maintained by Quebec agency, gas-	
St. Godfroy.. . . .	1	buoys.. . . .	30
St. Lawrence river, between Platon and		Maintained by Quebec agency, un-	
Montreal, gas-buoys.. . . .	65	lighted buoys.. . . .	15
St. Lawrence river, between Platon and		Maintained by Quebec agency below	
Montréal, unlighted buoys.. . . .	194	Quebec, bell-buoy.. . . .	1
Serpent reef.. . . .	1	Maintained by Quebec agency below	
St. Placide.. . . .	52	Quebec, Whistling-buoy.. . . .	1

NEW BRUNSWICK.

Bathurst.. . . .	26	Neil harbour.. . . .	1
Baie Verte and Port Elgin.. . . .	36	Napan river, 24 stakes and.. . . .	3
Bay du Vin.. . . .	12	Northwest arm, Miramichi.. . . .	6
Beaver and Blacks harbour.. . . .	9	Northeast arm, 24 stakes and.. . . .	8
Black brook, Miramichi river.. . . .	3	Ox island, St. John river.. . . .	5
Black Lands gully.. . . .	12	Petit Rocher.. . . .	2
Buctouche, 34 stakes and.. . . .	22	Pisarinco.. . . .	2
Buctouche river, bushes and.. . . .	260	Pokemouche, number of bushes and.. . . .	7
Bartibogue.. . . .	13	Quaco (maintained by C. G. S.).. . . .	3
Campobello.. . . .	10	Richibouto and Albion.. . . .	33
Caraquet.. . . .	21	Richibuctou, Rexton and Browns yard	30
Cocagne, stakes, 30 and.. . . .	11	Shediac.. . . .	18
Dalhousie and Restigouche.. . . .	10	Shediac, north of island, 20 bushes and	2
Digdequash.. . . .	5	Shippigan, 17 pickets and.. . . .	20
Dipper harbour.. . . .	3	St. Andrews.. . . .	13
Dorchester.. . . .	3	Ste. Croix ledge.. . . .	11
Grande Anse.. . . .	4	St. John river.. . . .	77
Grand Lake and Salmon river bushing	73	St. Louis, 15 bushes and.. . . .	2
Grand Manan, 1 spindle and.. . . .	28	St. Simon, bay Caraquet.. . . .	4
Great Shemogue.. . . .	7	Tabusitac.. . . .	18
Hatfield point, bushes.. . . .	..	Tracadie, South Gully, 30 bushes and.. . . .	5
Harvey.. . . .	7	Tracadie, 100 bushes, North Gully.. . . .	11
Kouchibouguac and Black river, bushes	..	Tynemouth creek.. . . .	5
Lepreau.. . . .	3	Washademoak, 144 bushes and.. . . .	2
Letite and Back bay, 1 spindle and.. . . .	14	Waweig river.. . . .	2
Little Shemogue, 1 beacon and.. . . .	5	West Isles, 4 spindles and.. . . .	23
Little Shippigan.. . . .	12	Maintained by agency—	
Magaguadavic.. . . .	13	(gas-buoys).. . . .	12
Maquapit and French lakes, 20 stakes		(gas and bell, combined).. . . .	1
and.. . . .	4	(gas and whistling, combined).. . . .	10
Miramichi, 9 winter buoys, 1 lightship		(can and conical buoys).. . . .	..
and.. . . .	22	(whistling buoys).. . . .	..
Miscou.. . . .	8	(bell-buoys).. . . .	..
Musquash.. . . .	7	(bell boat).. . . .	..
Negua.. . . .	21	(lightships).. . . .	..
Little Aldouane, 25 bushes and.. . . .	5		

PRINCE EDWARD ISLAND.

Bay Fortune.. . . .	3	Little channel.. . . .	3
Beach point.. . . .	3	Montague.. . . .	7
Bedeque.. . . .	11	Murray harbour.. . . .	41
Brae harbour.. . . .	5	New London.. . . .	9
Brudenell river.. . . .	4	Orwell and Vernon river, 36 bushes.. . . .	6
Cardigan, Lower.. . . .	6	Pinette, number of bushes and.. . . .	5
Cardigan, Upper.. . . .	16	Port Hill.. . . .	12
Cascomspec, 12 stakes.. . . .	14	Pownal.. . . .	7
Charlottetown, 20 stakes.. . . .	21	Rollo bay.. . . .	3
Cove head.. . . .	3	Rustico.. . . .	5
Crapaud stakes and.. . . .	5	Savage harbour.. . . .	2
East river (Hillsboro').. . . .	17	Souris.. . . .	4
Egmont bay.. . . .	12	St. Peters harbour.. . . .	10
Egmont south, 8 stakes and.. . . .	2	Summerside.. . . .	10
Georgetown.. . . .	14	Tracadie.. . . .	7
Goose harbour.. . . .	2	West point.. . . .	1
Grand river, 1 beacon and.. . . .	12	Wood island.. . . .	5
Grand river, lot 14.. . . .	8	Maintained by agency (signal buoys).. . . .	4
Indian rocks.. . . .	1	Maintained by agency (conical).. . . .	4
Malpeque.. . . .	16	Maintained by agency (gas buoys).. . . .	5
Miminegash.. . . .	6	including Zephir rock.	

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List of Buoys maintained by the Department of Marine and Fisheries, &c.—*Con.*

NOVA SCOTIA.

	No. of Buoys.		No. of Buoys.
Advocate harbour.....	6	Martins Brook.....	6
Apple river.....	8	Meteghan river.....	2
Arichat.....	20	Northport.....	11
Argyle river and sound.....	9	North Sydney.....	5
Avon river.....	6	Neils harbour.....	1
Amherst Basin.....	4	Parrsboro'.....	6
Barrington.....	31	Petit de gras.....	12
Bear river.....	17	Pictou.....	6
Beaver harbour.....	8	Pope's harbour.....	1
Blandford.....	5	Port Félix.....	11
Bridgewater.....	10	Port Hood.....	7
Brule.....	5	Port Le Tour.....	15
Canning or Habitant river.....	6	Port Medway.....	9
Canso and St. Andrew passage.....	31	Port Morien.....	2
Cape Negro or Northeast harbour.....	17	Port L'Hebert.....	12
Cariboo.....	6	Pubnico.....	18
Chester.....	25	Pugwash.....	9
Cheticamp.....	12	Prospect Lower.....	10
Chezzeconk and Petpiswick.....	6	Port Mouton.....	5
Christmas island and Barra strait.....	11	Port Bickerton.....	5
Clarks Cove, West bay.....	3	Pennant harbour.....	8
Clarks harbour.....	17	Pringle's harbour.....	4
Cockerwit pass and Woods harbour.....	20	River John (stakes).....	3
Cooks cove, Toby cove.....	4	Roseway.....	3
Calf island bay.....	5	St. Anns.....	5
Crow harbour.....	3	St. Mary river.....	9
D'Escousse and Lennox passage.....	27	St. Mary river, up to Sherbrooke.....	18
Digby and Annapolis, 5 winter buoys.....	15	St. Peter's bay.....	16
Dover.....	4	St. Peters inlet.....	10
East Dover.....	3	Sambro.....	12
East bay, Bras d'Or.....	8	Shag harbour.....	15
Fourchu harbour.....	11	Sheet harbour.....	9
French Village, St. Margarets Bay.....	5	Shelburne.....	25
Great Bras d'Or.....	8	Ship harbour.....	9
Gillis point, Boulaceet.....	1	Ship rock.....	1
Guysborough.....	3	Shulee.....	8
Glace bay.....	4	Smith's island.....	1
Hay cove.....	14	Sydney.....	2
Harbour au Bouche (6 stakes).....	4	Shad bay.....	3
Ingonish, South bay.....	7	Sober island to Ecum Secum.....	21
Isaacs harbour.....	12	Spry bay.....	6
Indian harbour.....	4	Tangier.....	4
Jeddore.....	11	Tatamagouche 46 stakes and.....	18
Judique.....	1	Terrence bay.....	13
Ketch harbour.....	6	Tor bay.....	19
L'Ardoise.....	5	Three fathom harbour.....	5
Lahave.....	12	Tidnish.....	5
Little Narrows.....	10	Tusket (two contracts), (3 spindles).....	30
Little Dover.....	9	Upper Prospect.....	4
Little Bras d'Or.....	2	Wallace.....	15
Liverpool.....	3	West bay.....	3
Lockeport.....	6	West Dublin and Crooked channel.....	13
Lunenburg.....	8	Westport.....	3
Lunenburg, back cove.....	9	Weymouth.....	13
Lunenburg, middle south.....	16	Whitehead.....	9
Louisburg.....	7	Yarmouth.....	50
Liscombe.....	6	Maintained by agency—	
Mabou.....	19	(whistling buoys).....	13
Mahone bay and Chester.....	12	(bell-buoys).....	35
Main-à-Dieu.....	6	(steel conical and can-buoys).....	190
Margaree harbour.....	9	(gas-buoys).....	4
Merigomish.....	6	(combined gas and bell-buoys).....	5
Marie Joseph.....	13	(combined gas and whistling).....	27
Monseiller.....	10	(light vessels).....	2
Jegogin.....	7	Submarine Bell signal stations.....	3
McKinnon harbour.....	6	Submarine Bells attached to gas-buoys.....	1
Musquodoboit.....	7	Walton harbour.....	1

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LIST of Buoys in the Waters of British Columbia.

(GAS-LIGHTED BUOYS EXCEPTED.)

Name of Buoy.	Position.	Description.
Arrow lakes.....	In the Narrows.....	7 spar buoys.
Fraser river.....	In the Channels.....	13 can buoys.
Kootenay lake.....	At different points.....	9 platform buoys.
Hesquiat.....	Fairway harbour entrance.....	Whistle, steel, black and white vert. stripes.
Half-tide rock.....	Hecate passage, Clayoquot sound.....	Platform, ball, red.
North bank.....	" ".....	" drum, black.
Vargas rock.....	" ".....	" ball, red.
Meares spit.....	Deception channel.....	" black.
Stubbs spit.....	Stubbs spit.....	" "
Browning passage.....	West end of pass.....	Spar, red and black, horizontal bands.
".....	North shore bank.....	Spar, black.
".....	Middle bank.....	Spar, red.
Hankin rock.....	Mosquito harbour.....	Platform, red and black, hor. bands.
Round island (north).....	Round island bank.....	Spar, black.
" (south).....	Templar channel bank.....	Spar, red.
Templar channel.....	Village island.....	Steel can, drum, black.
Amphitrite point.....	Carolina channel, Barkley sound.....	Whistle steel, red.
Sutton rock.....	Ucluelet harbour.....	Platform, red and black, hor. bands.
Rosedale rock.....	Race rocks, Juan de Fuca strait.....	Steel can, black.
Whale rock.....	Esquimalt harbour.....	Spar, red and black, horizontal bands.
Patterson rock.....	".....	Platform, black.
Canteen.....	".....	Platform, red.
Channel rock.....	Victoria harbour.....	Platform, ball, black.
Songhies rock.....	".....	Spar, black.
Hospital rock.....	".....	Platform, ball, black.
Johnstone reef.....	Haro strait.....	Steel can, black.
Darcy shoal.....	".....	"
Sidney spit (east).....	Sidney channel.....	"
" (west).....	".....	Steel conical, red.
Sidney wharf (south).....	Shoal, Sidney wharf, V.I.....	Spar, red.
" (north).....	".....	"
Sidney rock.....	Rock.....	Platform, red.
Colbourne (south).....	Colbourne passage.....	Platform, drum, black.
Colbourne passage (north).....	".....	Platform, ball, red.
Celia reef.....	Shute passage.....	Steel conical, red.
Entrance point (Kelp rock).....	Satellite channel.....	"
Batt rock.....	Ganges harbour.....	Steel can, black.
Horda rock.....	".....	Platform, ball, black.
Benmohr rock.....	Trincomali channel.....	Platform, ball, red and black hor. bands
Governor rock.....	".....	Platform, ball, black.
Victoria rock.....	".....	Steel can, red and black, hor. bands.
Virago rock.....	Porlier pass.....	Spar, black.
Porlier pass fairway.....	".....	Bell, steel, black and white, vertical.
Grappler reef.....	Houston passage.....	Steel can, black.
Indian reef.....	Stuart channel.....	"
False reef.....	".....	Steel can, red and black hor. bands.
White rock.....	Trincomali channel.....	Steel conical, red.
South east.....	False narrows.....	Spar, red.
East.....	".....	Spar, black.
Middle.....	".....	Spar, red.
West.....	".....	Spar, black.
Rosenfeld reef.....	Strait of Georgia.....	Steel can, cage, black.
Gossip reef.....	Active pass.....	Bell, steel, black.
Sandheads.....	Channel across Sandheads.....	5 steel conical, black 8 steel conical red.
Point grey fairway.....	Burrard inlet.....	Ball, steel, red.
First narrows.....	South side of Narrows.....	Spar red.
Burnaby shoal.....	Vancouver harbour.....	"
Reef point.....	Strait of Georgia.....	"
Welcome point.....	Welcome pass.....	"
Tattenham ledge.....	".....	Spar, black.
Snake island reef.....	Strait of Georgia.....	Steel conical, red.
Horswell reef.....	".....	"
Clarke rock.....	Inner channel.....	Platform, black.
Entrance.....	Nanaimo harbour.....	Platform, triangle, black.

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LIST of Buoys in the Waters of British Columbia—*Con.*

Name of Buoy.	Position.	Description.
Gallows point	Nanaimo harbour	Platform, ball, red.
South channel	"	" diamond, black.
Middle bank	"	" ball, red.
South channel (west)	"	" diamond, black.
Satellite reef	"	" ball, red.
Middle bank (south-west)	"	Spar, red.
" (west)	"	"
Carpenter rock	"	Platform, ball, black.
Mill stream	"	" black.
Passage rock	Newcastle island passage	"
Departure bay reef	Departure bay	" ball, red.
Dorcas rock	Dorcas point, Vancouver island	Spar, black.
Hornby wharf reef	Lambert channel	"
Reef bluff (south)	Baynes sound	Steel conical, triangle, red.
" (west)	"	Steel conical, red.
Village point	"	"
Kelp bar crossing (west)	"	Spar, red.
" (east)	"	"
Atrevida reef	Malaspina strait	"
North reef	North end, Texada island	Spar, black.
Cortes island reef	Baker passage	Steel conical, red.
Shark spit	Marina island	"
Whaeton rock	Whaeton bay	Spar, red.
Siwash rock	Johnstone strait	Spar, black.
Ripple reef	"	Steel can, red and black, horizontal bands.
Swan rock	Addenbrooke point, Fitzhugh sound	Spar, black.
Walbran rock	Fisher channel	Steel can, red and black, horizontal bands.
Bloxam bank	Telegraph passage, Skeena	Spar, black.
Centre bank	Skeena river	Steel nun, red.
Hazel point	Middle passage, Skeena	Spar, red.
Fairview reef	Prince Rupert harbour	Steel conical, red.
Tugwell reef	Metlakatla	Spar, black.
Harbour channel (west)	"	Platform, black.
" (east)	"	"
Sparrowhawk rock	Cunningham passage	Steel can, red and black, horizontal bands.
Hankin reefs	"	Platform, red.
Dodd passage	Port Simpson	Spar, black.
Harbour reefs	"	Steel conical, red.

LIST of Gas Lighted Bell and Whistling Buoys established in British Columbia, 1908-9.

Name of Buoy.	Position.	Description.
Casey Point	Gas Buoy	Prince Rupert.
Spire Ledge	"	"
Barrett Ledge	"	"
Ellinor Rock	"	Chartham Sound.
Alford Reef	"	"
Hodgson Reef	Gas and Whistle	"
Skidegate Bar	"	Hecate Straits.
New England Rock	"	"
Stenhouse Shoal	"	"
Vancouver Rock	"	Milbank Sound.
Dall Pach	"	"
Haddington Reef	Gas and Bell	Broughton Straits.
Comox Bar	"	Gulf of Georgia.
Sturgeon Bank	Gas, White and Bell	"
Swiftsure Bank	"	Off Juan de Fuca Straits.

Buoys in store. May 22, 1909—

- 2 can buoys, 5 feet diameter.
- 1 can buoy, 6 feet diameter.
- 3 can buoys, $5\frac{1}{2}$ feet diameter with tripod.
- 1 can buoy, 6 feet diameter, with tripod.
- 1 conical buoy, 3—6 feet, large buoy.
- 1 conical buoy, 7 feet diameter.
- 1 nun buoy, 2 feet diameter.
- 3 conical buoys, 3 feet diameter.
- 1 whistling buoy (American pattern).
- 4 $8\frac{1}{2}$ combined gas and bell buoys.
- 3 $9\frac{1}{2}$ gas buoys.
- 2 11 gas buoys. Esquimalt.

Beacons, &c., in store.

- 2 beacons with tripod complete.
- 1 bell and whistle tripod.
- 2 tripods.

HYDROGRAPHIC SURVEY.

The hydrographic survey work is in charge of Mr. W. J. Stewart who has reported upon the work in the various waters, where the hydrographic survey staff has been employed.

Lake Superior survey was conducted in the *Bayfield* under command of Captain F. Anderson. The vessel left Owen Sound on May 10, 1908, proceeded to Nipigon bay on the north shore of Lake Superior and took up the survey work in the eastern approach to the bay and continued there until August 1. From that date the *Bayfield* was employed from Simmons harbour to Isacor Point to obtain a more correct delineation than is shown on existing charts. The work was completed and the vessel proceeded to Owen Sound and was put in winter quarters on November 23. The north shore of Lake Superior from Pigeon river to the eastern entrance of Nipigon bay, with the exception of Nipigon and Black bays, has been accurately and carefully surveyed and charted. Fifty miles between Simmons harbour and Isacor Point, has been traversed and plotted in detail but no sounding has been done in this stretch. On June 23, the *Bayfield* struck a rock and was damaged, repairs costing \$5,884.13.

The survey in the Atlantic coast division was performed in the *La Canadienne*, in command of Captain Irving Miles. The vessel left Sorel on May 18, 1908, and continued the survey of the mouth of the Saguenay river and the St. Lawrence river between Red island and Razade islands. A large scale plan of the mouth of the Saguenay river was completed showing accurately the many shoals and banks in the Saguenay. The general work of charting the St. Lawrence river was carried on for the purpose of acquiring greater accuracy of detail for the new charts.

In May, 1908, a small party in charge of Mr. Chas. McGreevy was engaged in surveying Cumberland basin, Nova Scotia, with a view of supplying charts more in detail.

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On Lake of the Two Mountains, Ottawa river, the survey party under charge of Mr. A. J. Pinet, resumed operations on May 1, 1908, using the yacht *Josephine*. Fair progress was made, advancing the survey to a stage where completion is expected in 1909.

The Pacific coast survey was continued on April 3, 1908, by a party in charge of Captain P. C. Musgrave, in the southern approach to Prince Rupert harbour and the mouth of Skeena river. On June 10, the new hydrographic steamer *Lillooet* was put in commission under the command of Captain Musgrave and completed a survey in Chatham Sound, east of Lucy and Rachal islands, and from Tree bluff to Island point. An important result of the survey at entrance to Prince Rupert harbour was the finding of a shoal head of eleven feet upon Alexandra patch where it was supposed that a depth of ten fathoms existed.

All of the eastern officers of the survey staff were engaged in the office at Ottawa plotting the season's notes and preparing for charts engraving. The work upon Lake St. Francis charts made some progress.

The charts issued to the public were the following: Lake St. Peter, White island to Orignaux point, Lake St. Louis and Key harbour, Georgian bay.

In connection with the St. Lawrence river charts, the services of Captain J. G. Boulton, retired naval officer of Quebec, were secured to assist the officers in preparing sailing directions for the river between Quebec and Kingston.

The report of Mr. Stewart forms Appendix No. 8 of this report.

DOMINION STEAMERS.

'MINTO.'

The C.G.S. *Minto* is a single screw vessel specially designed for ice-breaking in the Strait of Northumberland.

She was built in Dundee, Scotland, in 1899 and is 225 feet long, 32 feet 8 inches broad, 18 deep, 372 net, 1,090 gross tonnage, and 216 nominal horse-power.

At the beginning of the fiscal year 1908 she was plying between Pictou and Charlottetown in conjunction with the s.s. *Stanley* until April 25, when she was put on the marine slip at Pictou, had her bottom examined and painted and on May 5 came off the slip. Her topsides were then caulked, cleaned and painted, and she left for Quebec on June 23. After fitting out there, she sailed down the Gulf of St. Lawrence, called at St. John, N.B., Mingan and other points, returned to Quebec, went to Montreal and reached Charlottetown on July 28. Here the usual number of her crew were paid off and she remained at the Marine wharf, undergoing general repairs preparatory to the winter service, which she resumed on December 14.

When five miles out of Charlottetown harbour, she sighted the schooner *Jasson* loaded with coal and in distress, went to her relief and towed her into Charlottetown harbour.

The *Minto* remained on the Charlottetown-Pictou route until December 26, when she was transferred to the Georgetown-Pictou route, where, with the exception of delays caused by heavy ice, from January 30 to February 3, and on February 25, from March 23 to 27, made regular trips on this route until the end of the fiscal year.

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In the winter service, the *Minto* made 49 round trips, carried 84,469 packages of freight weighing in all 4,468½ tons; freight earnings were \$6,171.99; carried 2,401 passengers; earnings \$3,274; provided 1,457 meals to passengers, \$206.10, and 487 berths, \$487; total earnings, \$10,139.09.

STANLEY.

The C.G.S. *Stanley* is a steel single screw ice-breaker, built in Govan, G.B., in 1888. She is 207·8 feet long, 32·00 feet wide, 17·9 feet deep; is 397 net, 914 gross tonnage, 300 nominal horse-power.

She was on the Charlottetown-Pictou route on April 1, 1908, and from that date until the 23rd, continued to make tri-weekly trips there.

Her boilers being then cleaned, she began the buoy service on the second of May and placed buoys at Rifleman Reef, Fitzroy Rock, Cape Bear, Farras Shoal, Jouri-main island Shoal, Zephyr Rock and West Point.

Anchoring in the Strait of Northumberland all night, of May 8, on account of dense fog, her anchor fouled the Anglo-American telegraph cable and so injured it as to interrupt telegraphic communication between the Island and the mainland. Completing the buoy service on May 13, she was sent, on the 15th, to help repair the damage done the cable. It was raised and spliced, after which the *Stanley* returned to Charlottetown on May 17. The following day, she sailed for Pictou where she was put on the marine slip. Returning to Charlottetown on June 17, she was caulked, cleaned and painted, left for Pictou for bunker coal and sailed for Quebec on July 14 to take part, with other departmental steamers, in the Tercentenary celebration and returned to Charlottetown and Pictou on August 3 to undergo general repairs for the approaching winter service; made necessary preparations and sailed to Summerside to carry freight and passengers when the Steam Navigation Company's steamers stopped. She made return trips daily, between Summerside and Pointe du Chene till the 21st, when she was put on the Charlottetown-Pictou route, remaining there till the 25th, and then went on the Georgetown-Pictou route where she was plying at the end of the fiscal year.

During the winter service, the *Stanley* made 50 round trips, carried 93,002 packages of freight weighing in all 1,620·81 tons; 2,223 passengers; provided 1,495 meals, and 589 berths.

Her earnings were:—

For freight.	\$6,443 97
For carrying passengers.	2,884 00
For meals.	263 50
For berths.	589 00

Total earnings. \$10,180 47

BRANT.

The crew joined the *Brant* at Charlottetown on April 13, 1908. She was thoroughly fitted out, scraped, caulked, cleaned and painted. She then towed the tug *Prince Edward* to Crapaud and placed a conical buoy on Brackley Point reef. She then placed the Charlottetown harbour buoys. Arrangements were made on May 6 with the

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Prince Edward Island Tug Company to charter the *Brant* for passenger and freight service and she remained in their employ until June 5. From that date to August 26, she was engaged conveying coal to East Point fog alarm and supplies to light-stations. She was engaged in wharf inspection until September the 22nd, and in the light-house and buoy service until the close of navigation. Her crew was paid off on September 30.

Receipts—

From Department of Public Works.	\$ 35 00
“ Prince Edward Island Tug Company.	450 00
“ Buoy contractor, Foster.	80 00
Total receipts.	\$565 00

LANSDOWNE.

The *Lansdowne* is a wooden steamer 188 feet long, 32 feet wide, 15 feet deep, and 680 gross tonnage. She is employed in the lighthouse and buoy service of the New Brunswick agency of this department.

On April 1, she was employed in delivering supplies to lighthouses under the superintendent of lights. On the 8th, she succeeded, after considerable difficulty, in landing building material at Machias. The vessel was then employed in placing gas buoys until April 16, and after that date supplied coal to the lightship *Lurcher* and to fog-alarm stations. On May 6, the *Lansdowne* was put on Hilyard's blocks, part of the stem, cut-water, main keel, false keel, and planking were renewed, caulking and painting done, all at a cost of about \$2,000.

During the month of June and part of July, the vessel was employed in delivering supplies for the maintenance of lights, raising and placing gas and other buoys; and on July 16, left St. John with supplies for lighthouses along the northwestern shore of the Bay of Fundy, in charge of her first officer. She returned to St. John on July 27; on August 1, resumed the delivering of coal, oil and other supplies to, practically the same light stations in the Bay of Fundy. During the months of September and October she attended to the buoy service in the Bay of Fundy and landed supplies.

The month of November was stormy and the *Lansdowne* had much difficulty in locating buoys which had drifted from their position and in supplying the lightships.

On her return to St. John, she was placed on Hilyard's blocks for repairs which cost about \$500. These being completed on December 16, the steamer was employed for the balance of the month in the buoy service.

On January 1, 1909, the vessel was at Yarmouth, N.S., and from there proceeded to some gas buoys, the lights of which were extinguished, relit them and went to the assistance of the *Lurcher* lightship which had left her moorings. The *Lurcher*, however, did not require assistance; the *Lansdowne* then proceeded to St. John to recover the Partridge Island bell boat. After this, the steamer endeavoured to recover some of the gas buoys which had drifted in the storm; the steamer arrived at Yarmouth on February 10. From that date she was engaged, until March 10, in replacing and recharging gas buoys, which was accomplished with great difficulty, owing to severe

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storms and unfavourable weather. Some large automatic and gas buoys were recovered and replaced; and the balance of the month was occupied in saving some valuable buoys which had been injured and had drifted from their moorings.

‘QUADRA.’

The *Quadra* is an iron steamer, 174 feet long, 31 feet beam, 13 feet 6 inches deep and 573 gross tonnage. She is employed in the British Columbia agency of this department. She was repaired and went into commission on the 13th of April. During the rest of the month she was employed in transporting materials for Pachena wireless telegraph station and in delivering stores to the west coast stations. The *Quadra* was in the buoy service in May and moved the automatic beacon from Green Top island to Holland Rock. From the 1st of June to the 15th of September she was employed in the lighthouse and buoy service, and from the latter date to the 30th of September was on a tour of inspection in the northern waters of the province, after which she recharged buoys and beacons with carbide.

The *Quadra* was then put on the slip of the Victoria Machinery Company, where she was cleaned and painted, and during the rest of the fiscal year was employed in lighthouse and buoy service.

WILLIAM JOLIFFE.

This vessel was chartered to assist the *Quadra* in replacing buoys that had been moved from their moorings by winter storms. Her services were dispensed with on the 27th of April, 1908, but she was again chartered for buoy service from the 12th to the 27th of October.

LEEBRO.

The *Leebro* was employed in coaling fog alarm stations and transporting fog alarm machinery to Pachena and Estevan stations, B.C. She then delivered coal to the gulf stations and oil, in the general lighthouse service, up to the 30th of September. From the 1st of October the *Leebro* was employed in the west coast telegraph service and the removal of workmen. In November she was engaged in the transportation of lighthouse supplies and in the recovery of the Swiftsure Bank gas buoy until the 9th, when her services were dispensed with.

CASCADE.

This vessel was chartered on the 20th of April, 1908, and was employed in the buoy service until the 25th, and conveyed men and supplies for the west coast trail until the 7th May. She resumed the lighthouse and buoy service until the 4th of July, when her services were dispensed with.

MONTCALM.

The *Montcalm* is a steel twin screw vessel, 245 feet long, 40.6 feet wide, 15.7 feet deep; 526 net, 1,432 gross tonnage, 406 nominal and 4,250 indicated horsepower at a steam pressure of 220 pounds.

This powerful icebreaker was built at Yoker, G.B., in 1904, for the St. Lawrence winter service, for which purpose she has proved very effective.

During the season of navigation, she was employed in the delivering of supplies to lighthouses and in carrying material for and workmen employed at the construc-

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tion of lighthouses and fog-alarms in the Gulf of St. Lawrence and Straits of Belle Isle.

In the spring she rendered assistance in the ice to vessels employed in the St. Lawrence trade, and in winter in breaking the ice-bridge at Cap Rouge.

Returning from her cruise in Cabot strait, and while rendering assistance through the ice to incoming vessels, she was struck, in Quebec harbour, by the *Milwaukee*, of the Canadian Pacific steamship line, about 9.30 p.m. of the 7th of May. She sank at Pointe-a-Carcy wharf during the night, was floated on the 16th, taken to the graving dock for repairs and was put in commission on the 30th of June. The repairs, made by George T. Davis & Son and the staff of the Quebec agency, cost about \$33,000.

From the 1st of July to the 1st of October she was in the light and buoy service in the Gulf of St. Lawrence and Straits of Belle Isle, and on her way back from a 'supply' trip brought back Marconi operators from Whistle Rock and Heath Point, the workmen from the Straits of Belle Isle and landed the crew of the wrecked schooner *Blanche Alma* at Father Point.

The *Montcalm* sailed for Seven Islands on the 28th of December and found half the bay covered with ice; she broke through ice ten inches thick for two and one half miles to Clarke City wharf then returned to Quebec on the 31st.

On January 12, 1909, the *Montcalm* began cutting the icebridge which had formed at Cap Rouge. This accumulation of ice was from fifteen to forty feet thick in some places. A channel 1,200 feet wide was made; and as the ice was loosened it floated down the river. The work was continued until the middle of April and the channel kept open as far as Quebec. The steamer's operations, not only opened navigation about three weeks earlier than it naturally would open, but also prevented the usual flooding of certain places along the banks of the river. By continued efforts, she was able to reach Lake St. Peter on April 19. Representatives of the Quebec legislature, the boards of trade of Quebec and Lévis, and of Laval University, were, on three occasions, on board the steamer and witnessed with satisfaction, her icebreaking operations.

The opening of the channel and the steady removal of the icebridge proved the utility of the undertaking and the fitness of the *Montcalm* for that particular kind of icebreaking.

DRUID.

The *Druid* is a single screw steel vessel of 59 nominal horse-power; 160 feet long, 30 feet beam, 12 feet 5 inches deep; 149 net and 503 gross tonnage.

With one interruption, this vessel was employed in the lighthouse and buoy service from Portneuf to Father Point, a distance of 185 miles, under the control of the Quebec agency of the Department of Marine and Fisheries. In this service, she placed, kept in position and raised the gas buoys, maintained the beacons, towed the three lightships to and from their stations, carried workmen, coal and supplies.

In December, she made a special trip to Ste. Anne-des-Monts with provisions, the schooner *Marie Blanche* with provisions for that place having, previously, been wrecked.

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ARCTIC.

The *Arctic* is a single screw, wooden steamer built in Keil, Germany, in 1901 and bought by this department in 1904. She is 161.4 feet long, 37.2 feet wide and 20.2 feet deep, is 518 net, 762 gross tonnage and 44 nominal horse-power.

In command of Captain Bernier, she left Quebec about July 25, 1908, with full provisions, outfit and crew for a two-years' cruise in the Arctic waters.

ABERDEEN.

The *Aberdeen* is a single screw steel vessel built in Paisley, Scotland, in 1894. She is 180 feet long, 31.1 feet wide, 16.9 feet deep; is 266 net, 674 gross tonnage and 200 nominal horse-power. She is in the lighthouse and buoy service of the Halifax agency of this department.

The *Aberdeen* loaded machinery and building materials at Halifax for Clark's Harbour and Cape Fourchu. From April 22 she was engaged in the buoy service, returned to Halifax and was employed in that harbour buoy service until the 28th. She then loaded machinery for Clark's Harbour and on the 30th, landed carbide and explosives at Sambro and returned to Halifax. The *Aberdeen* left Halifax on May 1, landed machinery and materials at Clark's Harbour, buoys and machinery at Yarmouth; was employed in the buoy service for some time and sailed for St. John, N.B., for lighthouse supplies where she remained until the 6th. She left with supplies for lighthouses and fog alarms. From the 12th to the 30th she supplied the *Lurcher* with coal and oil and attended to lights and buoys until August 16. From that date until the 24th she was laid up for repairs at Halifax and resumed the lighthouse and buoy service till September 19, when she was ordered to go into quarantine, remaining there four days.

She resumed her usual lighthouse and buoy service in Nova Scotia until November 26, when she began picking up buoys in Prince Edward Island waters. The *Aberdeen* left Souris, P.E.I., for the Magdalen Islands on December 3, raised the buoys there and returned to Nova Scotia waters where she operated until the end of the fiscal year.

' LADY LAURIER.'

The *Lady Laurier* is a twin screw, steel vessel, 214.9 feet long, 34.2 feet wide, 17.2 feet deep; 413 net, 1,051 gross tonnage and 186 nominal horse power. She was built at Paisley, Scotland, in 1902, and is employed in the lighthouse and buoy service of this department in Nova Scotia.

The *Lady Laurier* had a very successful year in the service. No casualty has been reported. She was in quarantine at Lawler Island from the 1st to the 5th of April, and from that date to June 16, was constantly employed in the lighthouse and buoy service. On the 22nd, she landed materials for the dog-fish reduction plant at Clarke's Harbour and during the month of August, delivered supplies at East Cranberry Island, Sable Island, Cape Race, Newfoundland and other stations along the coast of Nova Scotia, and on September 1, sailed to Sable Island, took 49 ponies on board and sailed for Halifax.

She attended the work at Cape Fourchu submarine bells, searched for the South West Ledge buoy which went adrift and after much difficulty, caused by unfavourable weather, placed it in position, on September 30.

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The *Lady Laurier* supplied lighthouses between Halifax and Cape Sable during the month of October, returned to Halifax where her bottom was scraped and the ship repaired, cleaned and painted and on December 1, resumed the buoy service, ending the year's operations by taking boilers from Halifax to Cape Ray.

CONSTANCE.

The *Constance* is a composite single screw steamer 115.6 feet long, 19.6 feet wide, 11.2 feet deep; 126 net, 185 gross tonnage and 50 nominal horse-power. She was built at Owen Sound by the Polson Iron Works in 1891.

She was transferred from the Customs service to the Fisheries Protection service.

'EUREKA.'

The *Eureka* is a steel, single screw vessel, 94.7 feet long, 22 feet wide, 11.9 feet deep; 170 gross, 91 net registered tonnage and 40 horse-power. She was built in Glasgow, Scotland, in 1893, for the Department of Public Works, is now in the pilot service of this department, and commanded by Captain F. X. Pouliot.

While wintering in the Louise Basin, Quebec, alterations and repairs were made preparatory to the approaching season's operations.

'SIMCOE.'

The *Simcoe* is a steel, twin screw vessel of 217 horse-power. She was built by Swan, Hunter and Wingham Richardson, Limited, Wallsend-on-Tyne, England, and launched in 1909, is 180 feet long, 35.2 feet wide, 15.2 deep; 913.8 gross, 437.63 net tonnage

The *Simcoe* is completed and will sail from Great Britain to take up the light-house service above Montreal and the buoy service in the Georgian bay.

'LILLOOET.'

The *Lillooet* is a twin screw steel steamer, 170 feet long, 27 beam, 15 feet deep, and has a displacement of 760 tons with 800 indicated horse-power. She is employed in the hydrographic survey in British Columbia and was built and equipped with the latest surveying devices for this service.

'BAYFIELD.'

The *Bayfield* is a steel screw vessel built at Meadowside, Patrick, G.B., in 1889. She is 140 feet long, 24.1 feet wide, 11.3 feet deep; 86 net, 276 gross tonnage and 160 horse-power.

She was engaged in the hydrographic survey in Lake Superior during the season of 1908. She left Owen Sound on May 10, and returned on November 23, 1908.

'GULNARE.'

The *Gulnare* is a screw steel vessel, 137 feet long, 20.5 feet wide, 13.6 feet deep; 106 net, 262 gross tonnage and of 64 horse-power. She was built at Scotstoun, Glasgow, Scotland, in 1893, and is employed in the tidal survey service of this department.

During the season of 1908, she was employed in the Strait of Northumberland.

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SHAMROCK.

The *Shamrock* is a single screw wooden vessel, built in Quebec in 1898. She is 117.3 feet long, 25 feet wide and 9.7 feet deep, 161 net, 237 gross tonnage and 61 nominal horse-power. She is employed in the lighthouse and buoy service of the Montreal agency of this department.

SCOUT.

The *Scout* is a wooden, single screw vessel of 27 nominal horse power, built in Cardinal, Ontario, in 1900. She is 103.6 feet long, 25.6 feet wide, 9.2 feet deep, 70 net and 176 gross tonnage. She is fitted with powerful search and electric lights and was used in the buoy service between Montreal and Kingston during the fiscal year.

LAMBTON.

The *Lambton* is a steel, single screw vessel of 89 horsepower, built at the government shipyards Sorel, P.Q., in 1908-9. She is 108 feet long, 25.1 feet wide, 12.7 feet deep; 323 gross and 182 net tonnage.

Her engines are triple expansion, inverted, direct acting, with working pressure of 170 lbs. to the square inch, and built by Flemming and Ferguson, Limited, Paisley, Scotland.

She is intended for the lighthouse construction and superintendence service of this department.

RESERVE.

The *Reserve* is a screw, wooden vessel, built in Buffalo, N.Y., in 1884. She is 61.8 feet long, 15.3 feet wide, 4.8 feet deep; 36 net, 49 gross tonnage and 30 horse-power. She is engaged in sweeping the channel, towing and attending the buoys under the control of the lighthouse depot, Prescott.

LA CANADIENNE.

The *La Canadienne* is a single screw iron vessel, built in Glasgow, Scotland, in 1880. She is 154.3 feet long, 22.7 wide, 10.9 deep; 227 net, 372 gross tonnage, and of 60 horse-power.

She was employed during the season of 1908 in the hydrographic survey in the St. Lawrence river.

LADY GREY.

The *Lady Grey* is a twin screw, steel vessel, built at Barrow, G.B., in 1906. She is 172 feet long, 32.2 feet wide, 15.9 deep; 65 net, 733 gross tonnage and of 353 nominal horse-power. She is fitted with sweeping apparatus for ship channel work and two 12-inch salvage pumps, each of which has a capacity of 2,500 gallons per minute.

Her powerful engines, twin screws and other equipment, render this steamer very useful for icebreaking, towing, sweeping and wrecking purposes. She was employed during the season of 1908 in the ship channel service.

ROUVILLE.

The *Rouville* is in the construction of lights service in the lower St. Lawrence river.

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The fisheries cruisers are:—The *Canada*, the *Petrel*, *Curlew*, *Ostrea* and *Constance* in the waters of the maritime provinces; *Kestrel*, *Falcon*, *Georgiæ* in the waters of British Columbia; *Viligant* in Ontario waters; *Princess* in Quebec waters.

LIGHTSHIPS.

THE LURCHER LIGHTSHIP.

The *Lurcher* lightship is 121 feet 3 inches long, 24 feet 7 inches wide, 19 feet deep; 269 net and 396 gross tonnage. Her station is near the Lurcher shoal, Bay of Fundy. The vessel is fitted with boilers and engine to enable her to steam to port in the event of dragging her anchor or breaking from her moorings in a storm. This lightship was on the station from the 1st of April until the 6th of January, 1909, when she lost her moorings in a heavy storm, but was replaced on the 9th of the same month. The *Lurcher* was taken from her station on 24th January and replaced by the *Anticosti*. In the meantime extensive repairs are being made to the *Lurcher*.

THE ANTICOSTI LIGHTSHIP.

The *Anticosti* is 121 feet 3 inches long, 24.7 feet wide, 19 feet deep; 269 net and 396 gross tonnage.

The *Anticosti* is stationed off Anticosti island in the gulf of St. Lawrence. This lightship was placed upon her station in the spring and remained there until November. It was decided to place the *Anticosti* on the station of the *Lurcher* lightship in the Bay of Fundy. On the way to that station the *Anticosti* struck the ledges off Canso while in charge of a pilot, and was injured to such an extent that it was necessary to take her to Halifax, where repairs were made to the hull. Upon completion of these repairs the *Anticosti* proceeded to Yarmouth and from there to the Lurcher station, where the vessel was moored on the 24th January, 1909, and remained there until the 18th of February. In a heavy gale the *Anticosti* broke from her moorings, but was replaced on the 22nd of February. She remained on the Lurcher station until the end of the fiscal year, and was finally replaced by *Lurcher* lightship.

The Prince shoal, Red island and White island lightships are under the Quebec agency and are kept in position under contract by keepers who receive the sum of \$3,000 for the season for providing and maintaining crews. Fuel, light and engine supplies are furnished and repairs made by the department. A small light boat is maintained on the Restigouche river under the Quebec agency.

The Miramichi lightship is in charge of a light-keeper under the control of the New Brunswick agency. This vessel was placed in position and taken back to winter quarters by the harbour master at Chatham.

The Barrington lightship is maintained in Barrington east bay, Nova Scotia.

The Sand Heads, British Columbia light broke from her moorings and drifted on the Sand Heads. She was assisted off and repaired.

The three lightships maintained on Lake St. Louis above Montreal were overhauled, placed in position and taken back to Lachine to winter quarters at the close of navigation. The Lake St. Peter lightship was painted and the usual repairs made before being put in position and wintered at Sorel.

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ICE FORMATION IN THE ST. LAWRENCE RIVER AND STRAIT OF NORTHUMBERLAND.

An investigation of the conditions governing the formation and disintegration of river ice in the St. Lawrence river and salt water ice in the Strait of Northumberland, on a large scale, was undertaken by H. F. Barnes, D.Sc., F.R.S.C., F.R. Met. Soc., Macdonald professor of Physics, McGill University, during the months of January, February, March and part of April, 1909. Professor Barnes was assisted by Mr. Jas. B. Woodyatt, B.Sc. Two months were spent on board the *Stanley* in the Strait of Northumberland and two months in the *Montcalm*, on the St. Lawrence river at Cap Rouge and above.

A report of the icebreaking observations has been received from Prof. Barnes which contains detailed information of each day's observations. The space in this report will not allow of the reproduction of Prof. Barnes' report in full, but the subject being one of great interest considerable space is here given to extracts.

'Through the kind assistance of the Department of Marine and Fisheries of Canada it has been possible for the writer to extend his studies of natural ice phenomena to include an investigation of the conditions governing the formation and disintegration of river ice on a large scale. It is a pleasure here to record great indebtedness to the minister, Hon. L. P. Brodeur, and to the deputy minister, G. J. Desbarats, for their unfailing interest in the work and their ready help on all occasions. An assistant was provided, Mr. Jas. B. Woodyatt, B.Sc., who devoted four months to the study; and it is a pleasure to mention his faithfulness and industry in collecting the observations under the writer's direction. Two months were spent on board the Canadian government icebreaker *Stanley* doing duty in the Northumberland straits, and two months were spent on the icebreaker *Montcalm*, which did such excellent work this year at Quebec. In this way the ice conditions were studied in two widely different localities. The one dealing with salt water ice where the problem is one of continually changing conditions, shifting with wind and tide, while the other dealt with the immense accumulation of ice at Cap Rouge and above, representing by its solidity the very opposite.

'From the point of view of possible winter navigation of the St. Lawrence, a study such as the present, is of the greatest importance. Information must be obtained by those skilled in scientific observation before anything very definite can be stated as to the feasibility of winter navigation. The present investigation, while not overlooking this point was undertaken primarily for scientific investigation. The result of this study shows where improvements can be made in order to lengthen the navigable season as far as the port of Montreal. This was partially demonstrated this year by the performance of the C.G.S. *Montcalm*. In treating the ice problem even those with the oldest experience are inclined to regard the task of ice breaking from the wrong end. Any one who views the ice accumulation in the river towards the end of the winter thinks rightly of the impossibility of coping with such masses. Where ice is prevented from accumulating, and usually the task of prevention is not an insurmountable one, these large masses cannot form. It is the work of but a few days or less for the formation of the famous ice bridge at Cap Rouge and yet it is the work of two months to break it down again, whereas the presence of an ice breaker during the first few days and after would prevent the bridge from forming altogether and make the task of keeping the river clear at that point, a simple one.'

WORK AT THE NORTHUMBERLAND STRAITS.

'Observations on the formation and action of salt water ice are of great interest. It is quite unlike fresh water ice, being so very variable in composition and different in appearance.

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'Prof. Otto Pettersson of Stockholm, President of the International Commission for the study of the sea, has made an extended study of salt water ice. As a result of his inquiry he finds that ocean water is divided on freezing, not into pure ice and a more or less concentrated solution of ordinary sea salt, but into two saliniferous parts, one liquid and one solid, which are of different chemical composition. It is found that the formation of sea ice is chemically a selective process. Some of the elements of the salt water are more fit than others to enter into the solid state by freezing; those that are rejected by the ice will preponderate in the brine, and vice versa. As a rule the ice is richer in sulphate, the brine in chlorides. With time the ice appears to give up more and more of its chlorides and to retain its sulphates. The general opinion has been that pure ice was formed at the freezing of sea water. The small impurities always present in sea ice were accounted for by adherent sea water, but it has been conclusively shown that the freezing of sea water involves a separation of its chemical constituents of which one part enters into the composition of the solid another into that of the liquid water. The actual salinity of the ice is of course small and was found to diminish with the age of the ice. Immediately after its formation sea ice contains a noticeable quantity of salt, chlorides as well as sulphates, carbonates and other salts. Such ice is very different from fresh water ice in its physical properties. It melts below zero, and begins to show signs of melting by contraction of volume at temperatures far below zero. Thus ice which contained as much chlorine as 2.73 parts per thousand commenced to contract at 14°C. (6.8° F.) and continued to do so up to the melting point. Ice formed by freezing at low temperatures of arctic sea water which contained 3.49 parts per thousand of chlorine began to contract in volume at 18° C. (0° F.) This phenomenon is, however, a relative one so far as any ice is concerned. Even fresh water ice contains small traces of impurities which cause a contraction of volume before the actual melting occurs. The purer the ice the sharper is the change from solid to liquid differentiated. E. V. Drygalski has found in his study of polar ice for the Berlin Geographical Society that the salinity of newly formed sea ice is from four to five parts of salt per thousand. He found what is very important, that the salt is not confined to the uppermost layer of the ice. The salt was found to be almost equally distributed in every layer of the sea ice from the surface to 68.4 cms. depth, where the salinity was four parts per thousand. But after two months the salinity in all layers decreased from four or five parts per thousand to one or two parts per thousand.

'A very interesting characteristic of the thin layers of salt water ice is their great mobility. It is entirely different in appearance to fresh water ice being white and the top layers seemingly full of mechanically suspended salt. Extreme brittleness which characterizes the fresh water ice is entirely wanting. A small wave set up in the water travels through it without breaking it, the thin layers rising and falling and exhibiting great plasticity.

'The observations made by Mr. Woodyatt were accurate temperatures of the water and air, the humidity, barometric pressure and the determination of the strength of the various forms of ice met with in the straits. A close watch was kept of any relation between air and water temperature and the effect of other meteorological conditions including the tides on the ice conditions. It was clear that the chief factors in the ice conditions in the straits were wind and tide. The temperature of the water remained very constant everywhere at 30° C. The severity of the air temperature had an influence on the quantity of ice formed, but the greatest difficulties in ice breaking were always experienced in the milder weather especially after a period of great cold. The intense frost appeared to hold the ice which was afterwards let free to be carried from immense distances by wind and tide.'

Mr. Woodyatt's notes to Prof. Barnes, of his observations on board the *Stanley* during each trip made between Georgetown and Pictou from December 31, 1908, to February 20, 1909, contain information respecting the ice conditions and the manner

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in which the *Stanley* behaved in the various formations of ice. The temperature, tides, winds, snow storms and rain all had their effect upon the progress of the steamer. On some trips the natural forces greatly retarded the progress of the steamer, in other cases the *Stanley* made her way across the strait with surprising ease. The following quotations taken from the notes of Mr. Woodyatt will serve to show the nature of the ice and afford a pretty accurate conception of the work which this fine little steamer has been engaged in during the winter season since 1888:—

‘December 31, 1908.—We made the passage without much trouble, but struck several large pieces of “pan” ice. (“Pan” ice is the name given to the large rafts of hard firm surface ice which drift about with the wind). There was a clear sea along the southeast of Prince Edward Island and in Georgetown harbour.’

‘Saturday, January 2, 1909.—Left Georgetown 7.00. Arrived Pictou 10.30. Sun very bright with practically no breeze. We struck hard ice south of Pictou island, and were delayed about 20 minutes getting through one big “pan.” The boat could not split this, but had to pound through it. Sometimes the boat almost came to a standstill. All this ice had come down by the tide, as the *Minto*, which passed the same spot an hour before, reported no ice worth speaking of. The ice was about one foot thick, but very hard, owing to the low temperature. The shoving of the wind and tide piles the ice up in even layers, making a very solid mass.’

‘Friday, January 15.—The partially formed ice came down with the tide this morning, and although we struck very little ice with any solidity, we ran through this slushy formation (known as “lolly”) most of the trip. It forms in flat disks of varying diameters from 3 or 4 inches up to as many feet. These are about $\frac{1}{2}$ inch thick. The space between the disks is filled with slush. In some cases the slush has cemented them together, but a very slight movement of the water breaks them apart. The continual movement of the water piles these disks on top of each other, and joins others on, always increasing the size of the pan, and this process forms what the captain and others describe as bad ice, but at present it has practically no effect on the speed of the ship. At first there appears a sort of thin slush on the surface. Its appearance resembles oil on water when some distance away. It has a surface tension, however, as shown from the fact that the sea from the ship does not break it up as it does the solid ice. This slush forms into little disks about 4 inches in diameter, which gradually grow in diameter. These disks have no power of cohesion, and the wind and movements of the water push them all around until several are piled half on top of each other, making pieces about 2 feet in diameter, the intervening spaces between them being filled with the slush. The water lapping up against these deposits the slush along the sides, making little ridges on top and along the borders. With these slushy edges the little clumpets seem to cohere, and as they are continually on the move, more and more pieces come together and stick, but a small wave will pull them apart or slide them on top of each other. The intervening slush hardens and cements the surface, giving the ice a chance to grow, which it apparently does very rapidly once this stage is reached. The tide is very strong in the strait and the ice is moved about continually, which keeps the cakes broken up into small areas, which it is no trouble to the boat to split, acting as a wedge.

‘Tuesday, January 19.—The wind was very cold to-day, and though most of the trip was through open waters, we had to break through several large pans. The ice was clearer and more brittle. It appears to be of the lightest green in colour, and cleaves perpendicularly to the surface. This ice is evidently not joined in the method described before, as it is more glassy and less powdery, but it is the result of very cold weather on still water. We got jammed twice in “pans” of hard ice, there was apparently no give at all; the ship pushed in and forced the ice down, but gradually lost headway and stopped. A second trial after going astern a hundred yards

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or so was all that was necessary in each case. This was the first real ice crushing that has been done so far. The pans were large enough to resist splitting, that is, the ship could not start a crack that would extend to the border and thus divide the pan, so the boat had to crowd through. The stern tanks were filled, lowering the stern deck below the wave set by the wheel, the bow thus elevated rode up into the ice and cracked it. It would crack off a piece on either side about twenty feet back. The edge of this piece in this position took up much less horizontal space, leaving an amount of open water for the boat to float on, while the main body of the pan remained intact. This and the splitting are the only two natural ways of the ships obtaining a free surface of water. After the ship passes the pieces right themselves, and 50 yards astern the path is completely blocked. Once we ran far enough in to be squeezed so tight that it took some little time to loosen.'

'Monday, January 25.—The winds of the last couple of days had jammed the ice in between Pictou island and Pictou harbour, and yesterday's cold weather cemented it. We ran about two miles out of the harbour and then came up solid. The ice was piled high, big cakes on top of each other, and these were impassable. There were large pans of ice of diameters varying from a few feet to a quarter of a mile; these were flat, but at their edges where they had been grinding each other big pieces were broken off and turned up, giving the pack the appearance of a lot of fields divided by rough fences. The pans themselves, though sometimes two and three feet thick, were not so hard to negotiate, but the barriers, consisting of ice "rafted" high above water, and very deep below, were simply impossible. The air was very cold and the ice brittle, but it was too solidly jammed by the rising tide for a crack to extend very far. The tide on the rise was making the ice run and carrying us with the ice. The ice at the edge of the fields could be seen "rafting" over and under the surface and piling up, the process being accompanied by very loud groans and the movement and sounds causing a very weird effect. Sometimes the ship would get caught in between two of the fields, then the ice would pile up against the side and jam her so that she could not move either ahead or astern until the ice shifted again. Finally the fires were burned down to wait for the tide to change. Until 1.00 this rafting and groaning kept on, and the ship wedged tightly in the packed ice was moved around it. At 1.00 the tide commenced to ebb, and then, as if by magic, big stretches of clear water opened out of the solid ice, and by skilfully taking advantage of these leads we rounded Pictou island and were past the worst part.'

'The wonderful effect of the tide upon the ice was the most interesting part of the day's experiences. It was hard to believe, after observing the ship make so little effect on the ice, to see the ice suddenly and silently disappear from sight, and disclose big stretches of clear water. The tide runs very fast at this point and the ice is carried three or four hundred yards in a very short time. The silent disappearance or rather opening up of the ice with the tide in the ebb stands out in contrast with the roaring and jostling of the ice when the tide is coming in. We arrived in Georgetown at 4.20, making the longest run of the season.'

'Wednesday, January 27.—The snowstorm ceased, and the day became clear. The wind was still strong from northwest, which was very unfavourable for us. We got under way on the beginning of a favourable tide. A favourable tide is one which tries to drive the ice against the wind, the result being a loosening of the pack. The *Stanley* did splendid work. Through 8 inches of hard, clear pan ice, she could make from four to five miles an hour. This ice was turned under to make way. In the softer lolly, there was more trouble. Great areas of lolly would cling to the sides and greatly impede progress. Sometimes as much as two feet of the ice on her side would be coming along with us. This clinging is not as if the lolly were frozen to the sides, but is more like the adhesion of packing snow. The snow that had fallen made the going bad, especially in the looser parts, where the water had washed it and turned it into slush. In the afternoon we were fighting westward about two miles north of Pictou island, trying to make the east end of it. We struck a big pan of ice extend-

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ing right up to the Island shore. This ice was about 10 inches thick. After driving through it for a quarter of a mile, we started a crack that ran ahead as far as could be seen (three-quarters of a mile at least).'

'Thursday, January 28.—The ice was clear and hard, but as before the ship made far better progress in the clear hard pans than in the broken lolly-covered debris.'

'Friday, January 29.—The *Stanley* has never done better work. With no open water in sight she battered along, through pans, barriers, and lolly, backing, turning and manoeuvring, but always getting on. She turned down three feet of solid, hard ice from the big pans and went rapidly through anything under a foot at a good five miles an hour. We were smashing through an 18-inch pan (extending for about two miles) when the tide started to move the ice. The pan we were in came together and nipped us, so that we could not move an inch either ahead or astern. This jamming is wonderful. The ice lifts the ship and presses until you can feel the plates springing.'

'Wednesday, February 3, 1909.—The ice was rafted up and grounded at the sides making a solid mass. It was all made up of broken pieces, turned and thrown into every position and cemented together. It thus had no lines of cleavage, and there was no splitting it. It just had to be knocked away, and ground up little by little, until finally a path was knocked through it, and the ship passed. Once past this barrier we found the ice opened up in a most unaccountable way. The ice was very heavy and covered with snow, making it very hard to get through, but the fields had been so divided by the strong flood tides that we had no trouble at all, following the leads, until we struck the open water off Cape Bear, when it was clear sailing into Georgetown where we arrived at 12.30.'

In the summing up of the notes of observations in the Strait of Northumberland, Prof. Barnes furnishes some valuable information upon the coming together and parting of the ice, the effect of higher and lower temperature upon the movements of the ice and the cause of the formation of lolly which accompanies hard ice. Some thermograph records are given and the effects of sudden changes in the weather are described. He states that, 'The ice troubles experienced by the *Stanley* were found to invariably occur on days of higher temperature following a period of colder weather. Prolonged cold weather had little or no influence when compared to the effect of a rise of temperature. This is what might be expected, for it is during the cold weather that the ice is formed, extending out from the shores and remaining securely frozen so long as the temperature is low. When, however, mild weather followed, this ice became loosened and was carried about by wind and tide. Prolonged mild weather cleared away the ice by rotting and melting it until no ice was found. The lolly which is an accompaniment of the hard ice is formed by spray and wind agitation on the surface in the proximity of the large fields of ice when the presence of the ice keeps the water at or near the freezing point. During very cold weather with no sun the lolly is formed everywhere on the surface and mixed with snow, is blown together in large masses. From the thermograph records obtained by Mr. Woodyatt, it is found that after the mild weather of January 10, 11 and 12, when the temperature was almost entirely above the freezing point, the colder weather of January 13 and 14, found no ice at all in the straits. On the 14th, a sudden rise of temperature from a minimum of 15° F. the day previous to 42° F. brought out masses of lolly and field ice. A second cold dip to 0° F. on the 17th followed by a rise to 43° F. on the 18th produced large pans of ice on the 19th when the temperature fell again. Cold weather with a strong wind from the north on the 19th made the 'pan' ice very brittle and difficult to split and produced lolly in such quantities as to stop the ship entirely on

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the 20th during a rise of temperature to the freezing point. The north wind is always accompanied by great dryness which produces a marked influence on the strength of the ice. Open water was experienced on January 23, although the temperature was 10° F. owing to the effect of two days of mild weather, when the temperature reached as high as 48° F. on the 22nd. Increasing cold weather followed from the 23rd to the 25th, but no trouble was experienced until milder weather which commenced at noon on the 25th and remained just below freezing until February 6. During this time a small rise and fall in temperature formed and again loosened the ice until the conditions became so bad, accompanied by adverse wind and tides, that the *Stanley* was very irregular in the trips. On February 8, after two days of mild weather above freezing no ice was found in the straits. A cold dip on the 8th, 9th and 10th followed by a rapid rise at noon on the 10th caused much trouble. Very mild weather on the 11th found no ice at all. On February 17, a rapid rise of temperature after cold weather caused a great deal of trouble again from masses of lolly so great as to stop the ship. On February 20, mild weather following a cold dip again caused much trouble from lolly.'

ICE-BREAKING IN THE ST. LAWRENCE RIVER.

The work of the *Montcalm* at what is termed the ice bridge at Cap Rouge in the St. Lawrence river, is described in the report of Prof. Barnes. Mr. Woodyatt, his assistant, began his observations on February 20. The steamer commenced at the ice bridge on January 12, and up to February 26, had made considerable headway in the heavy ice which had accumulated at Cap Rouge. A few extracts from notes of Mr. Woodyatt will convey a pretty general knowledge of the work of the *Montcalm*, the nature of the ice and show that the conditions were quite different from those which existed in the Northumberland strait. The work of the *Montcalm* was remarkable for the immense quantity of ice removed. Each day's work was similar to the one preceding with the exception of interruptions caused by the wind, weather and tides. The channel cut was about 1,200 feet wide which gave the steamer room to work and permitted the ice as it was detached from the main body, to float down stream.

'Friday, February 26.—The *Montcalm* left dock at 11,00, just at high water, and proceeded up the river to the ice bridge. When she started work at the beginning of the season the bridge extended down as far as the piers of the Quebec bridge. The *Montcalm* has been cutting a channel about 1,200 feet wide through the centre of it. The ice we were working in this morning was about three feet above the surface, and from 15 to 20 feet below. It consists of a tightly jammed mass of broken ice and snow. The ice is a great deal glassier than the salt water ice, and much more brittle. It parts or cracks with a report, and the thin shell ice, as it is borken by our sea, sets up a rattle which is entirely missing from the salt water ice of the same kind. The *Montcalm* bangs at the ice and, on hitting fresh unbroken stuff, goes into it for about 30 feet. If no large crack appears, another drive is taken in the same place but if a crack appears, the next drive is taken so as to shake the piece off. The size of the pieces separated vary, up to about 30 feet across. The ice floats away with the ebb tide and does not bother us any more. The *Montcalm* has been handicapped considerably so far this season by the fact that her boilers have been undergoing repairs, so that she has never had more than three out of the four in service at one time. At the first of the bridge the ice was about 15 feet out of water in a great many places and progress was slow, at the rate of about 50 feet per day (1,200 feet wide), but now we are doing between 200 and 300 feet per day. The fore tanks are all filled and the

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bow well down, in contrast with the fighting trim of the *Stanley*. They are afraid to run up on the ice as it might be too thick to crush, in which case she would stick until they could shift the water ballast. She does not turn the ice under, but rather crushes it sideways, the ice crumbling into snow and piling up on each side of the bow. On reversing she slides away without any sticking, other than a slight mechanical one when she runs up a little too far.

‘Monday, April 5.—Left at 6 a.m. The sun became very hot. The river in front of Quebec was full of ice, the remains of the bridge and the battures. We found the ice loose up to Cap Rouge and from there up to a point about four miles below Pointe-aux-Trembles, the river was clear. At this point we ran into the board ice about one foot thick and floating about one inch above the water. The stream is covered with this kind of ice as far up as the Richelieu Rapids where there is a clear space. The ice is covered with alternate patches of thin snow and water (probably from the melting of the snow). It is very clear and glassy and has all the colours from green to light blue. In some places it is honeycombed. The *Montcalm* is altogether unsuitable for this kind of ice. She crowds into it for distances varying from 150 to 400 feet, according to headway and steam and brings up solid. The *Stanley* would travel through this at from four to five miles an hour. However, there is a very strong current, five or six miles an hour, and that holds her back considerably. She does not crush the ice as the *Stanley* does, but tries to split it, and as there is no give to the ice, it being solid to both shores, she wedges herself into it. Instead of the ice turning down as it did when the *Stanley* got into a pan it rises and squeezes the ship. By backing and driving all the time we cut a passage our own width up to a point about a mile above St. Antoine church and then turned back. We found clear water on our way back until we got below Quebec bridge when we found the river still full of large pieces of floating ice, as in the morning.’

In summing up the work of the *Montcalm* at Cap Rouge, Prof. Barnes describes the manner in which the steamer negotiated the immense jam of ice and the cause, or causes of the accumulation. Frazil is referred to and its action upon the steamer when endeavouring to force her way through it. He describes its formation, the great quantity, elasticity and adhesiveness of this troublesome ice and indicates a method by which a steamer may overcome it and clear herself. He states, ‘It is sufficiently evident that the performance of the *Montcalm* was very satisfactory, and that she succeeded in enabling the ice to move out of the river much earlier than usual. No trouble to speak of was experienced at any point below where the ship was working. The only trouble was from the large pieces of ice cut off being blown back by wind and carried by the tides. This condition need not have occurred had the *Montcalm* been put to work earlier in the winter, before the ice jam at the narrow part of the river below Cap Rouge had formed. It was but the work of a few days for this jam to form and during that time the ship was not at work. It seems highly probable that the ship could have prevented the bridge from forming and thus allowed the masses of ice coming down from above, to be carried down the river. The ship had no trouble in keeping the river clear below the cut. There seems to be little reason why one or two powerful ice-breakers should not be able to keep the river clear from Quebec to Lake St. Peter at least. One difficulty might be encountered in the masses of frazil that would be forced in the open water. No form of ice gives the ice-breaker so much trouble as frazil or lolly ice. The ship is practically helpless when surrounded by masses of this material, chiefly from the difficulty of gaining sufficient water to float. It masses under the ship and by its buoyancy, and in cold weather its adhesiveness, pushes up and sticks to the plates. In the Northumber-

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land straits the *Stanley* was time and again completely stopped from the clinging of this ice. An observation made by Mr. Woodyatt on April 10, when stuck in the frazil, may help to indicate a way in which a ship may get free of this ice.'

'The presence of the frazil is always observed to lift up the surface ice. As soon as the surface sheet was carried off by the blow of the ship the frazil rapidly floated up and filled the opening. In so doing it surrounds the ship and squeezes out the water necessary for the ship to float. When in this condition it was observed that the frazil became rapidly melted and loosened on each side just at the point where the circulating water was discharged. The writer has shown elsewhere that frazil is easily disintegrated by a very minute temperature elevation in the water, which is so small as to have absolutely no effect on an ordinary thermometer. With the discharge water at 60° F. it was evident at once that this was sufficient to raise the temperature of the water high enough to disintegrate the frazil at and below the point of discharge. Had the circulating water been carried up to the bow of the ship and discharged there it is evident that the frazil from the bow aft would have been rapidly loosened and sufficient water available to float the ship away. The writer feels that an ice-breaker equipped with steam injectors at the bow would always be in a position to loosen the lolly or frazil and never be seriously impeded by it.

'The hydrograph records made by Mr. Woodyatt seem to indicate on a day of low relative humidity, when the evaporation of the ice and water is rapid that the ice is more resistant. At present, however, there is not sufficient data to definitely prove this point. It is a most unexpected phenomenon and deserves more careful investigation. A very large amount of heat is absorbed in the evaporation of a pound of ice or water at the freezing point, considerably more than the evaporation of a pound of water at the boiling point. Hence when evaporation is rapid as we know it to be over the surface of ice and water, the ice is more easily cemented together and the water is more rapidly congealed.'

LIFE SAVING SERVICE.

Monthly reports from the coxswains in charge of the life saving stations were received and the number of drills indicated. There were no casualties of importance reported, consequently the boats were used only for drilling purposes.

The motor life boat stationed at Banfield on the west coast of British Columbia broke from her moorings in a storm and became a total wreck on Robber island, Barkley Sound. It was determined to withdraw the crew from the station, but before they left they were instrumental with the assistance of the crews of the *Leebro* and *Tees*, in saving the lives of nine of the crew of the American schooner *Sequel* on January 24, 1909.

The surf boat belonging to Clo-oose station was sent to Banfield station and is in charge of a keeper.

Work was resumed on the west coast trails by a force of twenty men who were engaged in constructing the road and building bridges over the ravines. Twelve miles of road were completed during the year.

There are now 34 stations in the Dominion and they will be found enumerated with the kind of boats used, as usual, in the statement now in the report of Admiral Kingsmill, which forms Appendix No. 19 of this report.

WRECKING PLANT.

The yearly subsidies were paid to contractors when they became due and proof shown of the maintenance of the plant, in readiness to render assistance in cases of casualties to vessels. The amount of the subsidy to each contractor is \$10,000 per annum, paid semi-annually.

The contracts were made for a period of five years with each contractor. For the Lower St. Lawrence the contract was made with Messrs. Geo. T. Davie & Sons, Lévis, P.Q.; headquarters of the salvage plant, at Quebec; for the maritime provinces with the Dominion Coal Company, headquarters of the salvage plant, North Sydney, C.B.; for British Columbia, the British Columbia Salvage Company, headquarters for the salvage plant Victoria.

The following is a list of vessels assisted or salved by the plant of Messrs. Davie & Sons during 1908.

May 12, towed ss. *Ottawa* into graving dock after collision on the way between Quebec and Montreal. May 19, salved the D.G.S. *Montcalm*, sunk at Pointe-a-Carcy wharf after collision with the *Milwaukee*, and towed the vessel to graving dock; July 1, assisted ss. *Amethyst* which had been ashore at Goose island, to Quebec; August 15 salved ss. *Portsmouth*, ashore at Cap Chatte and towed her to Quebec; August 30, towed steamer *Murray Bay* from Tadousac to Sorel. September 6, salved ss. *Gustaff Adolphe* and towed her to Quebec from Goose island where she had stranded; September 13, salved ss. *Malin Head*, ashore Orleans island after colliding with the *Corinthian* and towed her to port; October 12, salved the ss. *Inishowen Head*, ashore at Wolfe's Cove; October 6, escorted ss. *Ashanti* from Madam island to Quebec; November 10, salved bark *Cambria*, ashore at Ste. Anne-des-Monts, and towed her to Quebec; November 20, proceeded from Quebec to ss. *King Edward*, ashore at Anticosti, but owing to lateness of season it was decided to let wreck remain until spring of 1909. December 1, proceeded to bark *Signi* ashore at Anticosti, with surveyors who found vessel submerged and condemned her.

The services rendered by the Dominion Coal Company's wrecking plant is reported as follows:—

February 17 and 18, ss. *Louisburg* assisted the ss. *Mount Temple* at Ironbound island. Made three unsuccessful attempts to float the *Mount Temple*.

April 14 to 20, ss. *Cacouna* trying to pick up ss. *Britz Huel* near Cape Sable spent six days searching.

April 20, tug *Douglas H. Thomas* with fire pump extinguished fire on board schooner *Davis* at Louisburg after she was abandoned by crew. Vessel had number of tanks of gasoline on board.

April 15, tug *Douglas H. Thomas*, went in search of missing vessels after a severe gale. All the missing vessels were located.

April 30 to May 3. Tug *Douglas H. Thomas* searched for the ss. *Norwood*, abandoned by crew near St. Pierre.

May 1. Tug *C. M. Winch* went to the assistance of schooner *Ronald L. Smith* which was ashore at Flat Point.

May 9. Tug *C. M. Winch* went to the assistance of the ss. *Weymouth* which was ashore at Petries Ledge, but the steamer floated before tug's arrival.

May 11. Tug *Douglas H. Thomas*, towed schooner *Pleasantville* from Canso to Louisburg. This schooner had become disabled.

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May 18 to June 3. Tug *Douglas H. Thomas* assisted ss. *Trold* which had been in collision with the ss. *Ottawa*, from Gaspé to Three Rivers.

July 9, ss. *Coban* proceeded from Chatham, tug *Douglas H. Thomas* from Louisburg and ss. *Cabot* with wrecking outfit from Sydney to the assistance of the ss. *Arcola*, ashore at St. Paul's island, but steamer was in such a condition that nothing could be done with her.

July 29, ss. *Cabot* went to the assistance of the schooner *Milo* at Richibucto.

August 3.—Went to the assistance of the ss. *Pors*, which was high and dry on the beach at Port Hood. She was floated with the assistance of the wrecking pumps. Tug *Douglas H. Thomas*, steamers *Coban* and *Cape Breton* and a dredge which we had on hire.

August 15.—Tug *Douglas H. Thomas* went to the assistance of the ss. *Bruce*, which was ashore at Port au Basque and also offered the *Bruce* owners the services of the ss. *Louisburg*, which was then at Sydney, but services were declined.

August 26.—Offered schooner *Evande*, which grounded near schooner *Pond*, the services of our tug, but the same was declined, the captain preferring the tug *Merri-mas*, as the same owners were interested in both vessels.

October 5 to 7.—Tug *Douglas H. Thomas* was in search of the water-logged schooner *George Sturges*, which was reported near the Magdalen islands, but failed to locate her.

October 27 —Sent tugs *C. M. Winch* and *Douglas H. Thomas* to the assistance of the ss. *Pors*, which was ashore on Petrie's ledge.

December 3 to 7.—Tug *Douglas H. Thomas* went to the assistance of the Elder-Dempster steamer *Bornu*, which was ashore at Gaspé.

The report of the work done by the British Columbia Salvage Company contains the number of vessels assisted or salvaged during the year 1908.

Five days' searching for ss. *Otter*, reported ashore off the west coast of Vancouver island, with broken tail shaft.

SS. *Vadso* ashore at Cape Lazo. Arrived at *Vadso*, January 18, 1908, returned to Victoria with vessel January 27. She was stranded N. 58 E. three-quarters of a mile distant from Cape Lazo, and was full of water; passengers taken off and landed at Union and sent from there to Victoria.

SS. *Iroquois* ashore at Jack's Point, near Nanaimo, vessel being full of water, was raised, pumped out and brought to Victoria, working four days, from October 27 to 30.

Steamer *Owen*, sunk at Cowichan gap, raised vessel, pumped out and brought to Victoria, working five days, from November 16 to 20.

SS. *Charmer*, ashore Vancouver narrows, near Brockton point December 3 to 5, inclusive, dense fog, vessel patched, pumped out and conveyed to Victoria.

Tug *Hope*, ashore at Boat Harbour from December 5 to December 8. Vessel full of water, was raised, pumped out, patched and towed to Victoria.

SS. *Northland* ashore at Enterprise Reef, November 27 and 28. Steamer hauled off rocks and towed to Seattle.

HALIFAX DOCKYARD.

The admiralty dismantled the dockyard and for some time it had received no attention in the way of keeping it trim. The agent of the department recommended

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improvements in the yard and repairs to the wharfs. For this purpose a number of men were employed in putting the yard in order, removing trees, and mending roadways. Several miles of submarine cable was stored in tanks. Wharf No. 4 was repaired by the removal of decayed portions and a new top put on it.

No. 3 pier has the heavy lifting crane upon it by which the heaviest buoys, moorings and materials are handled in connection with the buoy and lighthouse service. Upon this wharf, cinder covering to the depth of 6 inches was placed. His Majesty's naval ships bunker their coal at this wharf from the Welsh coal stored in the sheds. The appearance of the grounds has been greatly improved as the result of the labour employed and the work done.

INVESTIGATION INTO WRECKS.

The investigations into the cause of wrecks and casualties in 1908 were held as usual, but up to the time of the preparing of this annual report no report containing the judgments of the former Wrecks Commissioner and Assessors has reached the department. The list of casualties into which investigations were held forms Appendix No. 16 of this report.

WRECKS AND CASUALTIES.

Of sea going vessels 278 Canadian registered vessels with a tonnage of 16,571 were partially wrecked or totally lost and 26 foreign vessels were partially wrecked or totally lost in Dominion waters. Thirty-eight lives were lost and the value of property destroyed was \$1,222,976.

Of inland vessels 27 Canadian registered vessels were partially wrecked or totally lost, with a tonnage of 9,096, and 7 foreign vessels in Dominion waters. Total value of property destroyed, \$340,910.

METEOROLOGICAL SERVICE AND MAGNETIC OBSERVATORY.

The Meteorological Service and Magnetic Observatory are under the direction of Mr. R. F. Stupart, who has reported upon the operations of the fiscal year ending March 31, 1908.

There are now 445 stations more or less completely equipped for meteorological observations; 410 observers have furnished daily, weekly or monthly reports to the central office. The number of persons receiving pay in connection with the services is 238, of this number 24 are permanently employed in the Central Office, Toronto. At outside stations a few officers devoted the whole of their time to the service, others were employed during a portion of each day and some were employed only to display storm signals. The observers at 39 stations were paid salaries for two or more observations daily and telegraphed to Toronto. At 58 other stations, chiefly in outlying districts, the observers received remuneration for a more or less extended series of observations. Special observations during the summer months were collected at Winnipeg from 25 stations in the western provinces and embodied in a bulletin widely disseminated westward; for this bulletin service remuneration was allowed. Eighty-five persons were paid as storm signal agents and seven for special duties in connection with the time service. Over 200 observers report voluntarily, thereby contributing valuable information regarding the climate of the Dominion.

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The work at the Central Office was carried on under difficulties, in temporary quarters, pending the completion of the new meteorological building.

Weather forecasts covering 36 hours in advance and sometimes a longer interval, were issued twice daily, throughout the year. The weather charts on which the forecasts are based have information telegraphed from 37 stations in Canada, 64 stations in the United States and from St. John's, Newfoundland, and Bermuda. Morning forecasts were sent to the ports of the maritime provinces and to the western provinces and then followed a forecast for Ontario and Quebec and published widely in the press as well as being posted at post offices, telegraph offices and other frequented places. The evening weather chart is prepared and a bulletin issued for the press throughout the Dominion except British Columbia, in which province a local officer issues the forecasts, under the direction of the superintendent at Toronto.

During the winter months, a large number of special forecasts were made for shippers of perishable goods. Special warnings of snow and drift were issued to all Canadian railways and electric railways, for night service, in connection with snow blockades. Owners and masters of vessels consult the central office in the fall of the year.

Between April 1, 1908, and March 31, 1909, 1,555 warnings were issued to Canadian ports, 89.8 per cent of which were verified. The number of storm signal stations has been increased. There were fewer storms than in the preceding year, but many gales of more or less severity; 102 out of a total of 131 being in November, December, January, February and March.

Arrangements have been made to supply forecasts and storm warnings to the government of Newfoundland. Full meteorological equipment has been furnished six stations between the Athabaska river and the Arctic sea, namely at Fort McMurray, Hay river, Fort Norman, Fort Good Hope, Fort Simpson and Fort Macpherson. From reports recently received it is evident that valuable data will be furnished regarding the path of storms across America and respecting the mean distribution of pressure in high latitudes.

Tables of predictions and verifications are included in the report of Director Stupart, also the report relating to the Magnetic Observatory at Toronto and Appendices A and B, from the observers at St. John and Quebec and tables showing the difference of times between Quebec, Montreal, St. John and Toronto.

The report contains information respecting solar work, seismology, time service and inspection of stations. It forms Appendix No. 7 of this report. The expenditure for this service was \$124,717.06 for the fiscal year.

STEAMBOAT INSPECTION.

Canadian registered vessels inspected during the fiscal year numbered 1,680; gross tonnage, 382,170. Vessels inspected, but not registered in the Dominion, numbered 184; gross tonnage, 282,275 tons. The amount of fees collected for inspection was \$7,927.54.

The total expenditure in connection with inspection amounted to \$41,226.47, but part of this expenditure was for Dominion steamers and fog-alarms. The report of the chairman of steamboat inspection forms Appendix No. 9.

NAMES OF INSPECTORS.

Name.	Position.	Residence.
Edward Adams.....	Chairman of Board of Steamboat Inspection.....	Ottawa.
M. P. McElhinney.....	Inspector of hulls and equipment.....	"
I. J. Olive.....	" "	St. John, N.B.
Chas. W. Sealey.....	" "	Halifax, N.S.
William Evans.....	" "	Toronto, Ont.
M. R. Davis.....	" "	Kingston, Ont.
Philippe Duclos.....	" "	Quebec, P.Q.
Stephen D. Andrews.....	" "	Collingwood.
John Dodds.....	" "	Toronto, Ont.
E. W. McKean.....	" "	Collingwood.
J. B. Stewart.....	" "	Toronto, Ont.
T. P. Thompson.....	" "	Kingston, Ont.
Wm. Laurie.....	" "	Montreal, P.Q.
L. Arpin.....	" "	"
F. X. Hamelin.....	" "	Sorel, P.Q.
J. Samson.....	" "	Quebec, P.Q.
J. P. Esdaille.....	" "	Halifax, N.S.
C. E. Dalton.....	" "	St. John, N.B.
J. A. Thompson.....	" "	Victoria, B.C.
G. P. Phillips.....	" "	Kenora, Ont.
Frank M. Richardson.....	" "	Vancouver, B.C.
C. T. Schmidt.....	" "	Halifax, N.S.

MASTERS AND MATES.

The number of applicants for masters' sea-going certificates who passed examinations were 8; mates, 15, and 8 failed to pass; second mates, 12 passed and 8 failed. Of the applicants for inland and coasting and minor waters certificates 70 masters passed, 21 failed; 93 mates passed and 25 failed; 4 sea-going certificates of competency to masters were issued, 8 certificates to masters inland and coasting, and 2 to mates; 2 service certificates to masters and 4 temporary certificates were issued.

The expenditure during the year for this service was \$8,244.56, and total amount of fees \$4,192.50, showing an excess of expenditure over receipts of \$4,052.06.

The following statement shows the total receipts and expenditure on account of masters and mates since 1900.

—		Expenditure.	Receipts.
		\$ cts.	\$ cts.
For fiscal year ended June 30, 1900.....		3,750 69	4,221 50
" " 1901.....		3,720 25	4,808 24
" " 1902.....		3,305 59	5,288 52
" " 1903.....		4,968 36	5,790 50
" " 1904.....		7,761 17	4,795 00
" " 1905.....		5,884 74	4,643 85
" " 1906.....		7,068 15	5,526 00
" " March 31, 1907-8.....		5,934 16	2,294 50
" " 1908.....		11,508 31	4,306 05
" " 1909.....		8,244 56	4,192 50
		62,145 98	45,866 16
		45,886 16	
		16,279 82	

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The report of Capt. L. A. Demers, chief examiner of masters and mates, forms Appendix No. 14.

MARINE SCHOOLS.

The report of Capt. Demers, chief examiner of masters and mates, upon marine schools furnishes information respecting the number of lectures delivered and the attendance of seafaring men. Nine examiners of masters and mates delivered 284 lectures and the attendance was 3,998. The lecturers are men of experience in navigation and their lectures contain instruction of a valuable nature to men who purpose undergoing examinations for certificates. The report on marine schools forms Appendix No. 15.

SICK AND DISTRESSED MARINERS.

Under the provision of the Canadian Shipping Act, chapter 113, part V., s. 384, R.S., dues of 1½ cents per ton, registered tonnage, are levied on every vessel entering any port of the province of Quebec, Nova Scotia, New Brunswick, Prince Edward Island and British Columbia. The money thus collected forme the 'Sick Mariners Fund.' Vessels of the burden of 100 tons and less pay the duty once in each calendar year, and vessels of more than 100 tons registered tonnage three times in each year.

The officers and seamen of all fishing vessels not registered in Canada, do not pay sick mariners' dues nor participate in the benefits accruing therefrom, but such vessels registered in Canada may pay dues and participate in the benefits, and if more than 100 tons, only for the voyage at the beginning of which payment has been made, but vessels shall enjoy the same rights and benefits as are enjoyed by vessels which pay dues but are not engaged in fishing.

The receipts for the fiscal year ended March 31 last, amounted to \$67,483.46; the expenditure for the several provinces for sick seamen amounted to \$54,989.85, and for distressed seamen \$2,004.02; total, \$56,993.87.

The receipts of sick mariners' dues from each of the provinces are as follows:—Quebec, \$17,072.10; New Brunswick, \$10,258.37; Nova Scotia, \$20,108.06; British Columbia, \$19,725.09; Prince Edward Island, \$314.04.

The expenditure for each of the provinces is as follows:—

General account.	\$ 1,297 29
Nova Scotia.	23,863 07
Prince Edward Island.	4,259 58
New Brunswick.	6,569 09
Quebec.	9,194 00
British Columbia.	9,806 82

Total expenditure. \$54,989 85

The 'Sick Mariners' Act' does not apply to the province of Ontario, so no dues are collected from vessels in that province.

At the port of Quebec, sick mariners are cared for at the Jeffrey Hale and the Hotel Dieu hospitals, at a per diem allowance of \$1.50 per seaman, including medical attendance and board.

At the port of Montreal, sick seamen are cared for at the General Hospital and at Notre Dame Hospital. The charge per diem for each seaman, including board and medical attendance, was \$1.50.

Marine hospitals are maintained in Louisbourg, Yarmouth, Pictou, Sydney, Lunenburg and Point Tupper, in the province of Nova Scotia; and the sick seamen at Halifax, N.S., are cared for in the Victoria General Hospital for \$1.50 per diem per man, including board and medical attendance.

At Charlottetown, Prince Edward Island, sick seamen are cared for at the Charlottetown and the Prince Edward Island hospitals under arrangements made by the department with the managers of those institutions, \$1.50 per day, same as others.

The marine hospital at Victoria, British Columbia, has a medical superintendent who receives \$600 per annum and a keeper whose salary is \$600 per annum. He is also allowed \$5 per week for the board and attendance of each sick mariner.

At Vancouver, sick seamen are attended at St. Paul's hospital at a cost of \$1.50 per day each.

At St. John, N.B., sick seamen are attended at a cost of \$1.50 per day each.

Where no hospital is maintained in the maritime provinces, Quebec and British Columbia, the collectors of customs are authorized to care for sick seamen when the vessels to which they belong have paid sick mariners' dues.

Statement of receipts and expenditure on account of 'Sick Mariners' and 'Distressed Seamen' from the fiscal year 1900 to 1908, both inclusive:—

Year.	Receipts.	Expenditure.
1900.	\$59,971 84	\$32,743 30
1901.	59,783 34	34,944 93
1902.	65,853 83	51,827 12
1903.	64,851 55	48,151 48
1904.	61,778 29	50,801 78
1905.	58,372 34	51,000 18
1906.	60,183 90	50,120 42
1907.	44,704 59	37,362 11
1908.	69,364 45	59,957 92

The report of C. H. Godin, M.D., medical superintendent of marine hospital service forms Appendix No. 13.

INSPECTION OF LIVE STOCK SHIPMENTS.

The inspectors of live stock shipments have reported regularly and furnished a statement of cattle, sheep, horses, hay and grain shipped to the United Kingdom from the ports of Montreal, St. John, N.B., and Halifax.

It will be seen that the total number of cattle, sheep and horses shipped was greater than last year but much less than previous years going as far back as 1902-3.

The shipments from Montreal were as follows:—Cattle, 99,830; sheep, 10,111 and 116 horses. The United States cattle shipped via Montreal were 10,398, but that number is included in the total of 99,830.

The shipments from St. John, N.B., were 22,923 cattle, 151 sheep and 65 horses; of the cattle 220 were United States cattle.

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The shipments from Halifax were 3,097 cattle.

The statement of live stock shipments forms Appendix No. 12 to this report.

REPORTS OF AGENTS OF THE DEPARTMENT.

The reports of the agents of the department at Halifax, N.S., St. John, N.B., Quebec, Charlottetown, P.E.I., Victoria, B.C., and Montreal were received. These reports contain information relating to the construction of lighthouses, the moving of the steamers under the control of the agents, particulars relating to repairs to lighthouses, the placing of new buoys and maintaining the system of buoys. The works in the agencies where workshops are established are reported upon, also the delivery of light-house supplies to the various lighthouses by the agents or superintendents of lighthouses, where there are superintendents. Much detailed information is furnished respecting the operations in these agencies. The correspondence between the department and the agents was large for the year 1908. Instructions were given directly to the agents relating to the carrying out of the work and matters of importance which arose in the agencies were referred to the department for decision.

Attached to each agency are superintendents of lights who inspect the lighthouses and buoys, deliver supplies of oil and other material required for the maintenance of the lights. The Superintendent of Lights for Ontario confines his inspection to the condition of lighthouses and the delivery of supplies above Montreal. His office is at Ottawa.

LIGHTHOUSE BOARD.

Five meetings were held during the fiscal year and applications and recommendations for aids to navigation in the provinces of British Columbia, Quebec, Manitoba, Nova Scotia, New Brunswick, Ontario and Prince Edward Island were considered. The aids to navigation most urgently needed were recommended for approval.

MERCHANT SHIPPING.

The regulations with respect to ship's names which came into force on the 1st January, 1908, have been strictly carried out, and the name of every ship registered during the year has been submitted to this department for approval.

Supplements to the 'List of Shipping' were published every month, and those affecting this list and issued up to date are bound with this volume.

The total number of vessels remaining on the register books of the Dominion on the 31st December, 1908, was 7,602, measuring 702,324 tons, being an increase of 74 vessels and 3,636 tons as compared with 1907. The number of steamers on the register books on the same date was 3,084, with a gross tonnage of 483,031 tons. Assuming the average value to be \$30 per ton, the value of the registered tonnage of Canada on the 31st December, 1908, would be \$21,069,720.

The number of new vessels built and registered in the Dominion of Canada during the last year was 304, measuring 28,983 tons register. Estimating the value of new tonnage at \$45 per ton, gives a total value of \$1,304,235 for new vessels. This shows a slight falling off as compared with last year, but the year 1908 was not remarkable for its shipbuilding activity, not as regards Canada alone, but throughout

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the whole maritime world. However, despite this, the tonnage on the register books at the close of 1908 shows that Canada maintains her place amongst the maritime states of the world.

The list of vessels is published in the report called 'List of Shipping.' In that report is a statement showing the tonnage of each of the maritime states of the world, and that Canada ranks tenth in the list of countries, but the registered tonnage of the Dominion is not given, owing to the fact that Canadian shipping is included in the tonnage of Great Britain.

LIGHTHOUSE KEEPERS.

During the year the lightkeepers were classified and the salaries for the last quarter of the fiscal year were paid in accordance with the new classification. The list of light-keepers has been revised and is published in Appendix No. 10 of this report.

PORT WARDENS.

The port wardens of the Dominion reported at the end of the calendar year. Their reports will be found in supplement No. 1 to this report.

PILOTAGE.

The reports of the different pilotage authorities for the calendar year 1908 were received. These reports contain statements of the number of vessels piloted within the pilotage districts in and out of port, also financial statements of receipts and expenditures in connection with each district. The rates of pilotage charges under the by-laws will be found in these reports, which are published in Supplement No. 1 to this report.

MONTREAL HARBOUR COMMISSIONERS.

The report of the Harbour Commissioners, for the calendar year ending 31st December, was forwarded to the department as required by law. The report contains valuable information respecting improvements made during the year in the harbour. The harbour was extended to embrace the water front as far as the end of Montreal island. The total sea-going and inland tonnage of vessels which entered and cleared during 1908 was 5,548,028, being the largest in the history of the port, and 1,092 tons greater than in 1907. The increase in tonnage has been attributed to the improvements in the piers, sheds and in the St. Lawrence river ship channel. The facilities for loading and unloading large steamers embrace all modern improvements. While the average length of time taken in European ports for loading and discharging cargo is 10,000 tons in 14 days, in Montreal 13,750 tons have been handled in three days.

The Canadian Pacific liner *Mount Royal* discharged 4,250 tons inward and took on 9,500 outward of general cargo in 53 hours. The Allan line *Hesperien* has been unloaded and loaded in 40 hours. The saving effected by the new facilities has been 22 cents per ton. A floating crane has been added to the equipment for handling heavy machinery.

The financial statement of the commission is included in the report, which will be found in supplement No. 1 of this report.

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TORONTO HARBOUR COMMISSIONERS.

The number of vessels which entered Toronto harbour during the season of 1908 was 3,330, registered tonnage, 1,521,165. The report of the Toronto Harbour Commissioners is published in Supplement No. 1 of this report.

QUEBEC HARBOUR COMMISSION.

The Quebec Harbour Commissioners have reported respecting the improvements in the harbour. Three hundred and four vessels of a registered tonnage of 1,335,460 entered the harbour and discharged 206,459 tons of freight, 57,023 tons of coal, and 146,632 tons of grain; 72 vessels of 197,872 tons loaded 72,488 tons of cargo, 70,900 immigrants were landed from the different ocean liners at the immigration station. No records were kept of the cabin passengers. The report and financial statement of the commissioners is published in Supplement No. 1 of this report.

THREE RIVERS HARBOUR COMMISSION.

The number of ocean going steamers which entered the harbour of Three Rivers was 44 of a tonnage of 86,000 register, but a large number of barges, canal boats and tugs entered and cleared, amounting to about 160,000 tons. The report of the commissioners is published in Supplement No. 1 of this report.

SYDNEY AND NORTH SYDNEY HARBOUR COMMISSION.

The number of vessels which entered the ports of Sydney and North Sydney was 2,084, of a registered tonnage of 1,211,557. From these ports were shipped 2,203,298 tons of coal and 22,163 tons of steel rails by water to points outside of Canada. The receipts and expenditure will be found in the report of the commissioners, which is published in Supplement No. 1 of this report.

CORRESPONDENCE.

About 43,705 letters were received in the department during the twelve months ended March 31, 1909. The correspondence was carefully filed and replies sent as far as necessary. About 28,000 letters were sent out during the same period. Registered letters inclosing cheques sent out by the accountant's branch, forms, reports, circular letters and notices inviting tenders are not included in the number of letters enumerated, simply the letters inclosing them.

The forms are numerous and require special attention as the matters to which they refer are important. The tenders received are entered and passed upon and tenderers notified.

There has been an increase of about 5,000 letters received and about 8,000 sent out. In the records branch the letters received are carefully examined, entered and placed on file, and the copy of the reply attached so that the letters and replies can readily be seen and any subject easily followed up.

WIRELESS TELEGRAPHY.

Twenty wireless stations were operated by the department during the year, all of which worked satisfactorily.

The report of the superintendent of wireless stations forms Appendix No. 17.

SABLE ISLAND.

The annual report of Mr. R. J. Boutillier, superintendent of Sable island, was included in the report of the agent of the department at Halifax.

No known wrecks occurred in the vicinity of Sable island during the year, but White point and Sambro automatic gas buoys drifted ashore in January. The buoys were shipped on board the *Lady Laurier* early in the season.

The life-saving boats and equipment were in good condition. The island was patrolled forty-two times in day and thirteen times at night.

The men's quarters were removed a distance of 100 feet farther south and an addition of seven rooms and concrete cellar walls were built under the main building and the addition. Concrete walls were placed underneath the cattle barn and a concrete floor and other improvements and repairs to buildings were made.

The farming was carried on as usual, but owing to the unusually dry season, the results were not equal to previous years.

The live stock on hand consists of 70 head of cattle, 30 trained ponies, 3 imported stallions, 5 imported mares and 5 hogs. Of the wild ponies, 49 were shipped and 200 remain on the island.

The Sable island staff, consisting of Superintendent Boutillier, keepers of light stations and their families, life boat keepers, wireless telegraphy staff and surfmen, number 41.

The report of Superintendent Boutillier forms Appendix No. 18.

LEGISLATION.

Section 16 of the Government Harbours and Piers Act, Chapter 112 of the Revised Statutes of 1906, is repealed and a new section substituted relating to leasing to any provincial government, municipal council, harbour commission, shipping company or railway company, any wharf, pier or breakwater under the control of the Minister of Marine and Fisheries.

Section 1 of chapter 30 of the Statutes of 1907, An Act to provide for further advances to the Harbour Commissioners of Montreal, is amended by adding thereto subsections 2 and 3, relating to the interest on advances and time limit for construction.

Section 5 of the Montreal Harbour Commissioners Act, 1894, chapter 48 of the Statutes of 1894, is repealed and a new section substituted defining the port of Montreal; section 2 of the same Act places the port under the jurisdiction of the Minister of Marine and Fisheries.

Section 6 of the same Act is repealed and a new section substituted, defining the harbour of Montreal and limiting the jurisdiction of the corporation.

Section 7 of the same Act was amended by striking out the words, 'of the port of Montreal and.'

Section 19 of the same Act is repealed and another section substituted, relating to the jurisdiction over the harbour.

Paragraph 3, of subsection 2, of section 22, of the same Act is repealed and paragraphs 3, 3A and 3B, substituted relating to the powers of the corporation.

Paragraph (b) of section 26 of the same Act is amended by striking out the word, 'port' and substituting the word 'harbour,' relating to rules for navigation.

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Paragraph (c) of the said section of the same Act is repealed.

Paragraph (e) of the said section of the same Act is amended by striking out the word 'port' and substituting the word 'harbour.'

Paragraph (r) of the said section of the same Act is amended, relating to procedure.

Subsection 1, of section 38, of the same Act, is amended, relating to pilotage dues.

Paragraph (a) of section 39, of the same Act, is repealed and another paragraph substituted, relating to seizure for unpaid rates.

Subsection 4, of section 41, of the same Act, is amended by striking out the words, 'for pilotage dues, or is due.'

Subsection 1, of section 44, of the same Act, is repealed and another subsection substituted, relating to special jurisdiction of corporation.

Paragraph (b) of section 13, of the Navigable Waters Protection Act, Chapter 115 of the Revised Statutes, 1906, is amended; section 14 of the same Act is amended; section 16 of the same Act is amended, relating to removal of obstructions; paragraph (b) of the same Act is amended; section 18 is amended by adding Part III, Interpretation and General.

The French version of section 851 of the Canada Shipping Act, Chapter 113 of the Revised Statutes, 1906, is amended by adding at the end thereof the words, 'et il peut aussi nommer des adjoints du maître de havre à tout tel port.'

G. J. DESBARATS.

Acting Deputy Minister of Marine and Fisheries.

APPENDIX No. 1.

ANNUAL REPORT OF THE CHIEF ENGINEER OF THE DEPARTMENT
OF MARINE AND FISHERIES.

The Acting Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit the following report of the work done in the several services under the supervision of this office during the twelve months ended March 31, 1909.

This embraces work done at departmental headquarters on the construction of lighthouses, lightships and fog-alarms, the supervision of construction and repairs of lifeboats; the administration of the vote for the removal of wrecks and obstructions in navigable waters; tidal and current surveys; and the publication, examination and correction of hydrographic charts; construction of and repairs to fish hatcheries and refrigerators; engineering points in connection with the construction and maintenance of fish-passes; supervision of surveys of oyster beds; examination of applications for foreshore, wharf and other water lots as they affect the interests of navigation; preparation and publication of notices to mariners and hydrographic notes, &c.

STAFF.

There is a special staff appointed for the tidal and current survey work; the remainder of the work of the branch is attended to by the general staff of the office.

The following changes have been made during the year in the staff of my office:

On September 19, 1908, Mr. F. P. Jennings was appointed a draughtsman at \$75 per month.

On July 20, 1908, Mr. E. M. Longtin, formerly an assistant engineer in my branch, was appointed to succeed Mr. O. Arcand as district engineer for the Montreal district, at a salary of \$1,400.

During the year assistants from the office were sent out to supervise works of construction as follows:—M. de Miffonis, building reinforced concrete lighthouse towers at Cap Anguille, Newfoundland, Father Point, P.Q., and Estevan Point, B.C.; Mr. W. C. Surtees, superintending construction of reinforced concrete beacon at Spruce Shoal, Ont., and reinforced concrete lighthouse tower at Cape Croker, Ont.; and Mr. F. P. Jennings, examining site for construction of a new pier at the Lower Traverse, P.Q.

The assistant engineers appointed to attend to details of construction in the several outlying portions of the Dominion have rendered me valuable assistance, and I wish again to bear testimony to the efficient work done by Mr. Légère in the maritime provinces, Mr. P. E. Parent in the Gulf of St. Lawrence and Mr. J. F. Murphy on the upper lakes; also to the fact that since Mr. Légère was appointed acting agent at St. John Mr. Fosbery has been acting as assistant engineer in Halifax and doing very acceptable work. In consequence of the very great quantity of construction work in contemplation this coming season in British Columbia, it will be absolutely essential that there should be an engineer resident in that province next summer,

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and I propose sending my chief assistant, Mr. B. H. Fraser, to the Pacific coast at an early day to organize the season's work.

Mr. F. McDonnell, of my office, is employed as assistant inspector of fog alarms, and has during the past season been sent to the several stations on the great lakes to make a thorough inspection of the machinery with a view to later overhaul, to bring these stations up to the standard of modern requirements.

PERSONAL INSPECTIONS.

Personal inspections of construction work in progress have frequently been made during the year by Mr. Fraser and myself, and it is very desirable that such personal supervision of work should be extended as much as possible in the interests of efficiency. Examination of localities where work is proposed should always be made before the plans are prepared, and in the interests of both efficiency and economy it is to be regretted that the work, lately, has often been so much rushed as to prevent such preliminary inspections.

The principal inspection trips made by me during the past year were to Quebec in April and May last to inaugurate the season's active field work in the lower river; through the Rideau canal route in May to report on an extension of the system of lighting the more intricate stretches by stake lights; to the Georgian bay in June to inspect large repair works required; to the North channel and Lake Superior in August to arrange for new work and report on applications for new aids, and to Detroit in January to arrange for changes in lighting in Lake Erie and Detroit river.

In September I joined Rear Amiral Kingsmill in a tour of inspection of British Columbia waters, when a very thorough examination was made of all localities where aids to navigation had been asked for, where water lots were applied for, and where other interests requiring the care of the Minister of Marine were involved. A large number of reports have been submitted and acted upon.

On this trip Bela Kula was examined for the first time in my many visits to the Pacific coast, and a varied stock of information accumulated respecting many little known localities on the northern portion of the British Columbia coast. Special attention was given to the needs of navigation in the Grand Trunk Pacific terminus of Prince Rupert, and in its approaches from the Pacific through Brown and Edey passages, and all details are now on hand for placing aids to navigation when the completion of the transcontinental road will bring ocean traffic to this new northern port.

Triangle island was visited and selected as the site of a first-class lighthouse and wireless telegraph station, being the last of a line following up the Pacific coast of Vancouver island. It is a most interesting spot, rising 700 feet out of the open Pacific, perfectly bare, with the rocks surrounding the main island swarming with sea lions. The lighthouse to be built on its summit ought to be the most powerful, as it will be one of the highest, in the world.

OFFICE WORK.

A large proportion of the work done by the general staff of the branch consists in the construction, repair or improvement of light buildings, fog-alarms, beacons and other aids to navigation. Full details of the work done in this connection during the past twelve months are contained in a separate report which is attached hereto. (Inclosure A.)

Plans and specifications for all important new buildings and repairs, new vessels, &c., are made or approved in this office.

The following table indicates the work done in the drafting office during the twelve months ended March 31, 1909:—

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Description of Work.	Plans Designed.	Plans Received.	Copies Made.
Lighthouse towers and dwellings	32	2	185
Fog alarm buildings	10	1	31
Details	42	10	212
Wharfs, piers, &c.	1	1	9
Outbuildings	3	3	41
Machinery	-	13	25
Lanterns and illuminating apparatus	-	3	2
Buoys and apparatus	-	1	44
Marine hospitals	-	3	2
Steamers	-	5	-
Land surveys	5	26	48
Plans relating to foreshore	1	170	55
Miscellaneous	30	145	255
	124	383	909

Total plans for twelve months from April 1, 1903, to March 31, 1909	1,416
Charts received and recorded	114
Charts received and entered in chart books	17
Photographs received and recorded	347
Specifications written	35
Notices to mariners issued (comprising 321 subjects)	127

PUBLICATIONS.

The work of preparing and issuing notices to mariners continues to be heavy and urgent; during the past twelve months 127 notices, covering 321 subjects, having been published. Amongst important notices, involving considerable labour in compilation, and representing useful work done in the department, are:—

An index to last year's notices; description, plan, sailing directions and list buoys and beacons, Key Inlet, Ont.; description aids to navigation in vicinity of St. Andrews, Passamaquoddy bay, N.B.; hydrographic notes and descriptions of approaches to Prince Rupert, B.C.; position, lights and beacons, North arm, Fraser river, B.C.; and description of islets, shoals, and sailing directions, Brown passage, Chatham Sound, B.C.

During the past twelve months notices relating to waters outside of Canada were issued, covering 14 items relating to Newfoundland and Labrador, 1 item relating to the Atlantic, 15 to the inland, and 4 to the Pacific waters of the United States, as well as 10 notices referring to transatlantic and 3 notices referring to transpacific subjects. No attempt is made to issue a complete synopsis of British or foreign notices, but merely to republish items likely to be of immediate interest to Canadian vessels, or to vessels leaving Canadian ports for the more important or frequented foreign ports.

REMOVAL OF OBSTRUCTIONS.

During the past twelve months the following work has been done, under the annual appropriation for the removal of wrecks and obstructions:—

The schooner *George G. Houghton*, which sank in the month of the Detroit river, about 300 feet north of Bar point lightship, was removed by contract, by the Reid Wrecking Company, Ltd., of Sarnia, Ont., for \$1,975.

The schooner *Armenia*, which was sunk, in 1906, off Pelee island, Lake Erie, was removed by contract, by the Midland Towing and Wrecking Company, Ltd., of Midland, Ont., for \$5,850.

HYDROGRAPHIC WORK.

The hydrographic surveys of this department are now in charge of Mr. W. J. Stewart, who will make a special report of the year's progress.

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All hydrographic notes reaching the department are prepared for publication in this office, and embodied in notices to mariners.

In preparing notices to mariners, special attention has been paid to publishing all information obtainable respecting the hydrography of Canada, and the fullest possible sailing directions have been appended to all descriptions of aids to navigation, so as to increase the value of these notices. During the past twelve months the following hydrographic notes were published:—

Affecting the Atlantic Coast.—Derelict reported in Atlantic ocean; description of buoyage in vicinity of St. Andrews, N.B.; local magnetic disturbance Grand Manan island, N.B.; government survey steamer at work in Northumberland strait; experimental fog signal buoys in Halifax harbour approach, N.S.; description of dredging in St. Mary river, N.S.; depth of Green island bank shoal, N.S.; and uncharted rock reported in Lockeport harbour, N.S.

Gulf and River St. Lawrence.—Publication by department of hydrographic charts, St. Lawrence river, No. 9 (Lake St. Peter); No. 17 (Portneuf to Cap Santé); and No. 18 (Ste. Croix to St. Antoine); buoyage alterations in ship channel between Quebec and Montreal; and hydrographic information respecting Red islet bank.

Inland Waters.—Publication by department of new edition of Canadian list of lights and fog signals; publication by department of hydrographic charts No. 101 (Head of Thunder bay to Pigeon river); and No. 102 (Lamb island to Thunder cape); dates to which lights on great lakes will be kept in operation; description of buoyage in Toronto harbour; uncharted rock reported in St. Clair river; improvements and lighting arrangements Meaford harbour; removal of wreck of *Armenia* off Pelee island, Lake Erie; removal of wreck *George G. Houghton* from Detroit river; construction of tunnel between Detroit and Windsor; description, plan and sailing directions of Key inlet; and local magnetic disturbance in Lake Superior.

Pacific Coast.—Chart issued of southern approaches to Prince Rupert harbour; position of lights and beacons, and alterations to buoyage in Fraser river; description of buoyage, Nanaimo harbour; hydrographic information respecting Khutze arm, middle and north passages, Skeena river and Prince Rupert harbour; description of Stenhouse shoal and Celestial reef; anchorage notes of Bela Kula; and uncharted rocks and shoals reported off Lawn point; Frederick island; Brown passage; Schooner passage; Table island, and Gabriola reefs.

The usual annual edition of the list of lights and fog alarms in the Dominion, corrected up to April 1, 1908, was issued during the summer, with reprints of the portions relating to the Great Lakes and British Columbia bound separately for the use of mariners in those waters. This list has now become so bulky that it ought to be permanently divided into three portions, and printed only in that form.

I took advantage of my visit to British Columbia in the autumn of 1908 to revise and check the list of buoys, beacons and day marks on the Pacific coast, and found so many changes that it was necessary to rewrite the book. The work, which proved exceedingly heavy, was done during the winter, and the manuscript is now in the printer's hands.

I would again draw attention to the fact that there are no lists of buoys of eastern waters published, and that the time has long since passed when complete lists should be in the hands of mariners for their guidance. The work is a very large one, and I fear that our existing staffs are not sufficiently large to overtake it. To prepare correct lists would require the aid of surveyors with special hydrographic training. Lists

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have been printed from time to time of the buoys in the more important waterways, but it seems impossible to obtain precise information respecting the smaller harbours where the buoys are maintained under the contract system.

ICE-BREAKING.

The work of ice-breaking in Thunder bay and vicinity was continued during the past year. Contracts for the work were awarded, as in previous years, and the work was carried out in a satisfactory manner.

(1) The Canadian Towing and Wrecking Company, Limited, of Port Arthur, entered upon the second year's term of their three years' contract with the department to keep the harbours of Port Arthur, Fort William and West Fort William open for navigation until December 17, in each year, and to open those harbours each spring in time to admit upward bound vessels to enter the harbours as soon as Sault Ste. Marie canal should be opened for navigation. The contract price is \$30,000 per season, which includes an agreement to remove all lightkeepers in the vicinity from their stations at the close of navigation in each year.

(2) A contract was entered into with the Midland Towing and Wrecking Company, Limited, of Midland, to keep the harbours of Midland and Tiffin open until the close of navigation of 1908, for \$3,200.

(3) A contract was entered into with Mr. C. E. Pratt, of Parry Sound, to keep the harbours of Parry Sound and Depot Harbour open until the close of navigation of 1908, for \$300.

(4) A contract was entered into with Messrs. R. S. Fisher and A. Montgomery, of Collingwood, to keep the harbour of Collingwood open until the close of navigation of 1908, for \$300.

In each of the above cases the work was satisfactorily done, under the supervision of the harbour masters of the respective ports.

TIDAL AND CURRENT SURVEY.

This survey, of which Dr. W. B. Dawson is superintendent, has made substantial progress in the tidal branch as well as in the investigation of the currents, and I desire to draw attention in the strongest possible manner to the great practical value to the mariner of the results of the work so ably conducted by this indefatigable officer and his efficient assistants. The work proposed for the summer season was fully carried out. It included the investigation of the currents in Northumberland strait, which is the last extensive area which had not been examined, as well as tidal work at various points of special importance in different regions.

In addition to publications, which are widely distributed, and information sent on request, this survey contributes much assistance to other departments in the government service, and much extra work is done to put information into the special shape required for their purpose. Among the departments thus assisted are the Public Works, the Interior, the Dominion observatory and the Hydrographic branch of the Marine Department.

On the other hand, a quantity of tidal observations taken during surveys made by the Public Works Department or obtained by the hydrographic branch, are worked up by this survey and incorporated in the tide tables where they become available for the use of navigation.

Investigation of the currents.—At this juncture it may be well to sum up concisely what has been accomplished in this branch of the work, in view of the programme originally proposed when the survey was inaugurated, which was the examination of the currents on the leading steamship routes which run so great a distance through Canadian waters before reaching the open Atlantic. This pro-

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gramme has now been carried out successfully for practical purposes. Meanwhile the trade of Canada has increased more than 85 per cent the tonnage of ocean-going vessels at our ports having risen from 18,539,534 in 1893 to 34,732,172 tons in 1906. The information obtained has thus become of much greater value than could have been anticipated. The regions examined, with the seasons given to each, may be concisely stated as below, together with the publications that sum up the results, without mentioning the reports of progress in which more detail is given.

Gulf of St. Lawrence. Three seasons of 1894, 1895 and 1896, given to Cabot strait at the entrance to the gulf, the Anticosti region at the mouth of the St. Lawrence and the northeastern angle of the gulf leading to Belle Isle strait. Publication: 'The Currents in the Gulf of St. Lawrence,' describing the currents and explaining the general circulation of the water in the gulf.

Belle Isle strait; part of 1894 and the season of 1906. Publication: 'The Currents in Belle Isle strait,' with a chart and three plates illustrating the character of the current.

The steamship route south of Newfoundland, season of 1903. Publication: 'The currents on the southeastern coasts of Newfoundland and the indraught into the larger bays on the South Coast,' with a general chart and eight plates.

Bay of Fundy. Two seasons of 1904 and 1907, given to the lower part of the bay below St. John, N.B., and the steamship routes in its approaches off southern Nova Scotia. Publication: 'Tables of the Currents in the Bay of Fundy,' giving the direction and velocity of the currents, hour by hour, and the time of slack water throughout the region, and a chart of the currents.

Northumberland strait, in the season of 1908. An examination was made at seven points in the strait, and more specially at the three principal narrows where the current is strongest. The surveying steamer *Gulnare* was employed in this investigation, which was carried on for a month longer than the usual season to obtain more complete information.

In addition to these investigations with the surveying steamer, observations in the Traverse on the lower St. Lawrence were obtained from the lightships; during 1896 and 1897 in the upper traverse and during 1900 in the lower traverse. From these observations tables of slack water are published in the tide tables.

By means of the tidal observations of 1900 in the lower St. Lawrence, the former admiralty determinations of the relation between the turn of the current and the tide were reduced to a practical form by bringing them into relation with the tide tables. Special observations of the turn of the current were also taken at L'Islet and Rivière du Loup to check the results. Observations from the White island lightship, obtained by the Hydrographic Survey in 1907, have been treated in the same way.

In British Columbia observations of the turn of the current in the leading passes and narrows have been taken from shore for not less than one complete year; the periods of observation extending from 16 to 22 months. From these a special method of calculation enables tables of slack water to be published for First narrows, Active pass and Porlier pass.

For Seymour narrows, the only observations are those obtained by the United States Coast Survey in 1897. By calculating tide tables for Port Simpson for that year the relation of slack water to the time of the tide has been determined, which gives the best results yet available.

Tidal observations.—The principal tidal stations on the St. Lawrence and Atlantic coasts, including the new station at Charlottetown, have been maintained in continuous operation throughout the year. The Halifax station has been discontinued, as tidal record for thirteen years in all, has been obtained there, which is considerably longer than for any port in the United States. One tidal station on Anticosti island, commanding the mouth of the St. Lawrence, it has been found possible to dispense with. There will thus be in all seven principal stations in eastern Canada; and for six of these

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tide tables require to be calculated; namely, for Quebec, Father Point, St. Paul island, Halifax, St. John and Charlottetown. It will undoubtedly be possible to refer all the harbours of eastern Canada to these stations as ports of reference, as the regions commanded by each station have now been defined sufficiently closely to make this clear. The need for so many principal stations results from the complexity of the tides themselves.

During last season, the following additional information was obtained: On the lower St. Lawrence, at Crane island wharf and L'Islet, above and below the Beaujeu channel; the observations being simultaneous with Quebec. These have afforded a much improved basis for the tide tables for this channel, which is the shallowest point below Quebec. Also, further observations at Tadoussac and at Trois Pistoles, in connection with the hydrographic survey. In the Miramichi region, observations at Chatham and Oak point enable data obtained on public works surveys for Newcastle and other points to be utilized. In Chaleur bay, some further information was obtained. Observations were taken at Georgetown, P.E.I., for the benefit of the winter navigation; and further observations were obtained at Pictou for comparison with the movement of the currents in Northumberland strait. Some preliminary observations were obtained in the upper reaches of the St. John river, which will give an indication of value for future work there.

All these observations were taken by means of registering tide gauges, in continuous operation day and night. Several short periods of tidal observations by the Public Works Department were also worked out; and complete information was obtained regarding their bench marks in New Brunswick. The only set of these observations that proved long enough to be serviceable, was for St. Andrews, N.B.

Tide Tables.—The data for the calculation of the tide tables for the St. Lawrence and the Miramichi region have been completely revised, in view of the further observations obtained. For the tide tables for 1910, two additional tables have been prepared; the turn of the current in the Traverse, and tide tables for Prince Rupert, B.C. Also, the pocket editions for Quebec and St. John have been extended, and a new table showing the arrival of the bore at Moncton has been added, as this is much desired. These pocket editions, which were published chiefly for the convenience of the pilot service, have met with much wider appreciation. The edition of the tide tables has now reached a total of 14,000.

The Great Lakes.—A beginning in observations on the lakes has been made, at the mouth of the Go-home river, on Georgian bay. This work will be supervised by Prof. Loudon of Toronto University without remuneration; a small grant for expenses being made by this survey and some special instruments being provided. The record of the water level in Lake Ontario, as recorded at Toronto by the harbour master, is now forwarded regularly to this survey.

It is not expected that a tide of any practical importance will be found on the lakes; but observations of the amount of wind disturbance will be valuable. The wind occasions a wide oscillation or seiche, which is of importance to shipping: as it affects the depth of the water in harbours during storms, to the extent of several feet in some localities. It is thus a question of the reduction of the available depth and even the grounding of vessels; or on the other hand the flooding of wharfs.

Staff.—The investigations of the currents in Northumberland strait were begun under the personal direction of the superintendent, and were left in charge of Mr. S. C. Hayden with the help of an assistant engaged temporarily, as the observations were continuous day and night. Captain T. G. Taylor, the master of the *Gulnare*, gave valuable co-operation in the work, in addition to his ordinary duties. Mr. H. W. Jones was engaged in the erection and supervision of summer tidal stations. In the winter season, the reduction of the observations and the calculation of the tide tables are made by the same staff; with the addition of Mr. P. M. H. Leblanc, recently appointed.

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who assists in the office work. The various members of the staff have often responsible work to do at a distance, in the erection, inspection and repair of tidal stations.

Proposed work.—It is proposed during the coming season to carry forward the tidal investigations in British Columbia, and to obtain further data which are much desired on that coast. In order to leave the staff free for this work, arrangements are being made to utilize the *Gulnare* in the lighthouse service during the coming season; to assist in overtaking the press of work in that branch.

Respectfully submitted,

WM. P. ANDERSON, M. Inst. C.E.,
Chief Engineer.

Chief Engineer's Office,
Department of Marine and Fisheries,
Ottawa, Canada, April 1, 1909.

(INCLOSURE A.)

DETAILED REPORT OF THE CHIEF ENGINEER OF THE DEPARTMENT
OF MARINE AND FISHERIES ON CONSTRUCTION, ESTABLISHMENT
AND IMPROVEMENT OF LIGHTHOUSES AND OTHER AIDS TO NAVI-
GATION UP TO MARCH 31, 1909.

To the Acting Deputy Minister,
Department of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit a detailed report on work done in the construction and establishment of aids to navigation for the twelve months ending March 31, 1909.

NOVA SCOTIA.

NEW AIDS TO NAVIGATION.

Amherst Point.—A light was established on the outer end of the government wharf. It consists of a Chance anchor lens lantern, elevated on a mast 26 feet above high water, and visible from all points of approach seaward. The work was done by day labour, at a cost of \$124.10.

Eatonville.—A small wooden lighthouse was erected near the government wharf in the harbour. The tower is square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. The tower is 22 feet high from its base to the ventilator on the lantern, and the fixed red dioptric, 5th order, light is elevated 24 feet above high water, and is visible six miles from all points of approach seaward. The work was performed by contract, by Mr. A. H. Dyas, of Parrsboro, Nova Scotia, for \$675.

Mitchener Point.—A lighthouse was established on the marsh south of the point. It is a wooden tower, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. It stands on a square cribwork foundation, and is 42 feet high from base to top of ventilator on lantern. The illuminating apparatus is fixed white dioptric, of the sixth order. The tower was erected by contract, by Mr. L. Mury, of West Arichat, N.S., for \$2,050.

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Parker Cove.—A lighthouse was erected on the government wharf, at a point 57 feet from the outer end. It is a wooden tower, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white; and is 22 feet high from base to top of ventilator on lantern. The light is fixed red dioptric, of the sixth order, visible from all points of approach by water. The tower was erected by contract, by Mr. John P. Rooney, of Granville Ferry, N.S., for \$365; and an additional sum of \$45 was allowed him for protection work in front of the tower.

Beaver Island.—A 3-inch duplicate low pressure diaphone plant, operated by two 6-H.P. oil engines, was installed in a wooden fog-alarm building, rectangular in plan, on concrete foundations. The plant was purchased from the Canadian Fog Signal Company, Toronto, for \$2,424, being the price agreed upon for exchanging an old style for a new style plant. The machinery was installed and building erected by day's labour, at a cost of \$3,919.18.

Flint Island.—A 3-inch duplicate diaphone plant, operated by two 12-H.P. oil engines, is being installed in a wooden fog alarm building, rectangular in plan, on concrete foundations. The plant was purchased from the Canadian Fog Signal Company, of Toronto, for \$8,100; the fog alarm building is being erected by day's labour, at a cost to date of \$3,225.72. In addition to above, a reinforced steel concrete tower will be erected next season.

Pugwash Harbour.—Two sets of range lights were established; one at Biglow point, and the other at Steven point. The range lights at Biglow point, in one, lead into Pugwash road to the intersection of their alignment with that of Steven point range. Both towers are wooden buildings, square in plan, with sloping sides, surmounted by square wooden lanterns, the whole painted white. The lights are fixed white, and are shown from catoptric reflectors. The front tower is 22 feet and the back tower 33 feet high from base to top of ventilator on lantern. The Steven point range lead up, from the intersection of their alignment with that of the Biglow point range, to the turn in the channel to the southward, inside the harbour. Both towers are wooden buildings, square in plan, with sloping sides, surmounted by square wooden lanterns, the whole painted white. The lights are fixed white, catoptric. Each tower is 22 feet high from base to top of ventilator on lantern. The work was done by contract, by Mr. L. Murry, of West Arichat, N.S., for \$1,990.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Apple River.—The fog alarm machinery was overhauled and partly renewed, and the old horn was replaced by a diaphone. Two new Robb-Mumford boilers were installed, and a reservoir tank, 20 feet square, built. The work was done by day's labour, at a cost of \$752.35.

Brier Island.—It was found that by placing the diaphone above the building, on a level with the whistle much better results were obtained. The room was, therefore, extended up to encase the diaphone, and a heating pipe installed. The work was done by day's labour, at a cost of \$326.35.

Cape Fourchu.—A new boiler, purchased from the New Burrell-Johnson Iron Co., of Yarmouth, N.S., for \$425, was installed in the fog-alarm building.

Cape Roseway.—The fog-alarm machinery is undergoing repairs, and several of the parts are being renewed. The fog horn engine, recently removed from Cranberry island, was repaired and installed; and the work is being done by day's labour, at a cost, to date, of \$300.

Little Hope.—The steel framed concrete dwelling for the lightkeeper, in course of construction last year, was completed, and other improvements carried out. The work was done by day's labour, at a cost of \$1,357.97.

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Mauger Beach.—Extensive repairs were made; 225 feet of cribwork were renewed on the north side of the lighthouse, and several tons of stone ballast placed as riprap; the plank walk between the tower and dwelling was also renewed. The work was done by day's labour, at a cost of \$863.37.

Wedge Island.—About 150 feet retaining cribwork were constructed on southwest side of island, as a protection to the lighthouse tower; the work being done by day's labour, at a cost of \$889.53.

Cap la Ronde.—About 400 feet of retaining cribwork were constructed, as a protection to the lighthouse tower. The work was done by day's labour, at a cost of \$1,194.67.

Ouetique.—Cribwork protection work was placed around the lighthouse tower; the work being done by day's labour, at a cost of \$400.15.

Flat Point.—The lighthouse tower deck was replaced by a new lantern platform, and other changes made to the top framing, to accommodate the new illuminating apparatus. A test is now being made at the station of one of the standard diaphone plants, with a view of deciding on the desirability of installing such a plant in place of the fog whistle now in operation. For this purpose, a temporary building is being erected, and the necessary air compressors and machinery parts installed. The work is being done by day's labour, at a cost to date of \$940.83.

McKenzie Point.—The rebuilding of the lighthouse tower, and repairs to light-keeper's dwelling house in course of construction last year, were completed by day's labour, at a cost of \$579.18.

Cape North.—The double dwelling for the fog-alarm engineer and lightkeeper, in course of construction last year, was completed by day's labour, at a cost of \$2,321.60.

Margaree.—The lighthouse tower and keeper's dwelling house were practically rebuilt, as the old buildings had become thoroughly dilapidated from age. The work was done by day's labour, at a cost of \$1,116.68.

Mabou.—The range mast lights hitherto shown were replaced by permanent towers. The front tower is a wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. It is 33 feet high from its base to the ventilator on lantern, and the light is elevated 30 feet above high water. The back tower is a wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. It is 47 feet high from base to top of ventilator on lantern, and the light is elevated 44 feet above high water. The buildings were erected by contract, by Mr. E. C. Embree, of Port Hawkesbury, N.S., for \$2,450.

Pictou Harbour.—The Fraser Farm range lighthouses were removed to new sites, a distance of about half a mile westerly from the old positions. The towers were replaced on concrete foundations and securely anchored. The work was done by contract by Mr. Jas. Arbuckle, of Pictou, N.S., for \$816.

Cape Race.—A new double dwelling for the fog-alarm engineers, in course of construction last year, was completed, and a new storehouse erected. The work was done by day's labour, at a cost of \$2,396.82.

St. Paul Island.—A new 3-inch duplicate fog-alarm plant was purchased from the Canadian Fog Signal Company, of Toronto, for \$3,594; the price agreed upon for exchanging an old style for a new style plant. This it is proposed to erect in a new building at the north end of the island, and to abolish the present fog-alarm, which is worn out, as soon as the new one is ready to operate.

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In addition to the above, minor repairs were executed at the following stations:—

Eddy Point, cribwork repairs.	\$174.23
George Cape, bracing tower.	63 70
Cape d'Or, machinery repairs.	107 41
Pubnico, cribwork repairs.	256 41

NEW BRUNSWICK.

NEW AIDS TO NAVIGATION.

Fort Monckton.—A lighthouse tower was erected in the old fort near the entrance to Gaspereau river. It is a wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, the whole painted white. The tower is 33 feet high from base to top of ventilator on lantern, and stands on a square cribwork foundation. The work was done by day labour at a cost of \$1,191.52.

Kouchibouguac.—Two sets of pole range lights were erected at the entrance to Kouchibouguac river. The lights are shown from Chance anchor lens lanterns, hoisted on poles, with small sheds at their bases. The front masts are 15 feet and the back masts 25 feet high. The work was done by day's labour at a cost of \$764.71.

Peck Point.—The wooden lighthouse tower formerly at Ward point was removed to Peck point. A wooden fog-alarm building was also erected there, and the 1-inch diaphone plant, purchased last year, installed. The building was erected by contract, by Mr. Amos Lawrence, of Sackville, N.B., for \$419, and the other work performed by day's labour at a cost of \$489.28.

Reid Point.—A mast light was established on the public wharf at this point on the Kennebekasis river. The light exhibited is fixed white, elevated 24 feet above high water, and is shown from a 7th order Chance anchor lens lantern. The work was performed by day's labour at a cost of \$59.63.

Richibucto.—Range mast lights were established on the north beach, replacing the inner range formerly maintained on the south beach. The front light is elevated 28 feet and the back light 44 feet above high water, both lights being fixed white. The work was done by day's labour at a cost of \$343.59.

Portage Island.—A mast light, to constitute the front light of a range when aligned with the old light, was established on the southern end of the island, and consists of a Chance anchor lens lantern, exhibiting a fixed white light, hoisted on a pole 27 feet high.

LIGHT DISCONTINUED.

Anderson Hollow.—The light formerly shown from the lighthouse tower on the shore north of the government breakwater was permanently discontinued.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Machias Seal Island.—A 50-h.p. Robb-Mumford boiler, purchased from the Robb-Mumford Engineering Company, of Amherst, N.S., for \$1,365, was installed; some spare machinery parts were provided, the large reservoir repaired, and the tramway put into good order. The work was done by day's labour at a cost of \$996.89.

Gannet Rock.—Considerable damage was done by storm to the tramway, which required to be practically renewed. The fog alarm building was also damaged through the same cause and repaired. The work was done by day's labour at a cost of \$775.36.

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Swallowtail.—The tramway was repaired; about 75 feet of iron rails and wooden stringers were laid and a concrete bulkhead built at foot of tramway as a protection against storms. The work was done by day's labour at a cost of \$601.80.

Head Harbour.—The lighthouse tower was repaired, a new tramway built and the bridge between fog-alarm building and mainland completed by day labour at a cost of \$1,764.46.

Passamaquoddy Bay.—Further repairs were made to the St. Andrews east beacon pier. When the sheathing was stripped off the pier was found to be in a very bad condition, there being an absence of tie rods, which necessitated very heavy work in rebuilding. The work was done by day's labour at a cost of \$3,405.72.

Wilmott Bluff.—The new wooden lighthouse tower, in course of construction last year, was completed. It is square in plan, with sloping sides, surmounted by a square wooden lantern, and is 42 feet high from base to top of ventilator on lantern. It stands on a cribwork foundation, and was erected by contract by Mr. John C. Palmer, of Kars, N.B., for \$1,060.

Cape Spencer.—A new wooden dwelling for the fog alarm engineer was erected by contract by Mr. J. E. Kanes, of St. John, N.B., for \$1,840, and a coal and oil shed erected by contract by Mr. E. Rourke, of St. John, N.B., for \$340. In addition, 500 feet roadway were constructed between lighthouse and fog-alarm, and repairs made to tower. The roadway and repairs were performed by day's labour at a cost of \$835.92.

Letite.—A new boiler, purchased from the New Burrell-Johnson Iron Company, of Yarmouth, N.S., for \$580, was installed, and some repair parts for machinery provided.

Buctouche.—About 400 feet of close pilework were built as a protection to the lighthouse tower, and the boathouse moved back to a safer position. The work was done by day's labour, at a cost of \$549.39.

Escuminac.—The alterations to the fog alarm building, in progress last year, were completed, and the building resheathed. The work was done by day's labour, at a cost of \$571.64.

Miscou.—Repairs and alterations were made to the lighthouse tower, to accommodate the new illuminating apparatus; the work being done by day's labour, at a cost of \$757.89.

Little Belledune.—A wooden dwelling was erected for the lightkeeper, the work being done by contract, by Mr. S. Gammon, of Bathurst, N.B., for \$1,100.

In addition to the above, minor repairs were executed at the following stations:—

Grindstone island, machinery repairs.	\$194 19
Lower Caraquet, additions to dwelling.	212 06
Pokemouche, repairs.	60 00
Shippigan, cribwork repairs.	372 85

PRINCE EDWARD ISLAND.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

East Point.—A new wooden fog alarm building, rectangular in plan, on concrete foundations, with reinforced concrete chimney, was constructed; and the machinery erected therein, including the installation of two new 25-h.p. boilers, and several new

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machinery parts and fittings. The work was done by day's labour, at a cost of \$5,072.35.

Panmure Island.—A new dwelling house for the fog alarm engineer is being erected by contract, by Mr. J. M. Clark, of Summerside, P.E.I., the contract price being \$1,900.

QUEBEC.

NEW AIDS TO NAVIGATION.

Little Bonaventure.—A light was established three-quarters of a mile eastward of Little Bonaventure river. It consists of a Chance anchor lens lantern hoisted on a pole, 20 feet high, with shelter shed at base. The work was done by contract, by Mr. J. Bujold, of Bonaventure, P.Q., for \$127.

St. Godfroy.—A pole light was established on the outer end of the government wharf at this place, about 1 mile eastward of mouth of Nouvelle river; the light is shown from a Chance anchor lens lantern, hoisted on a pole 20 feet high. The work was done by contract, by Mr. S. Grenier, of St. Godfroy, P.Q., for \$103.

Cap Anguille.—The reinforced steel concrete tower, and wooden fog alarm building, in course of construction last year, were completed, and the 5-inch diaphone plant installed. A large coal shed and boathouse were also erected, and other improvements executed. The work was performed by day's labour, at a cost, this year, of \$6,941.91.

Cape Dogs.—It is the intention to erect, during the coming season, a reinforced steel concrete lighthouse tower, wooden fog alarm building, and double dwelling house. To expedite the hauling of materials, &c., from a very difficult landing place, roadways were blasted from the shore to the sites, and an inclined railway constructed on trestle-work. A power-house, for running trams and derrick, was erected, and a concrete wall built at the mouth of a large gorge, to permit the gathering of fresh water when required. In addition, some of the material for fog-alarm building was purchased, as also the machinery for running the fog alarm plant. The work is being done by day's labour, and the expenditure to date is \$6,433.64.

Crane Island.—The 5-section steel lighthouse tower, in course of construction last year, was completed. (See illustration.) It is square in plan, with sloping sides, surmounted by a wooden watchroom, and an octagonal iron lantern. The tower is 90 feet high from base to top of ventilator on lantern. The old tower was cut down to one story, and capped by a pyramidal roof, to be used as one of the series of telephone stations now being established in ship channel. The new tower was purchased from the Goold, Shapley, Muir Co., of Brantford, Ont., for \$1,184, and was erected by day's labour; the expenditure this season being \$2,055.18.

Ste. Anne de Beaupré.—The two range lighthouse towers, in course of construction last year, were completed. They are wooden buildings, square in plan, with sloping sides, surmounted by square wooden lanterns, each tower being 32 feet high from base to top of ventilator on lantern. The work was done by day's labour, at a cost this season of \$268.93.

St. Pancras Point.—A combined lighthouse and keeper's dwelling house was established. It is a square wooden building with an octagonal wooden lantern rising from the middle of its hip roof, and is 37 feet high from base to top of ventilator on lantern. The light is fixed white dioptric, elevated 82 feet above high water, and visible 14 miles. A storehouse, shed and landing wharf were also erected; the work being done by day's labour, at a cost of \$6,139.30.

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LIGHT DISCONTINUED.

Cap Charles.—The old lower back pole light was permanently discontinued.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Belle Isle (N.E. end.)—The cast-iron lighthouse tower was reinforced in concrete, and further strengthened by concrete flying buttresses. A large coal and oil shed was built, and hot air furnaces installed in the lightkeepers' dwelling houses. The work was done by day's labour, and the expenditure was \$8,550.56.

Belle Isle (S.W. end.)—The wooden lighthouse tower, from which the low light was shown, was taken down; the old foundation raised 3 feet, and a new circular metal lantern placed thereon. The fog alarm machinery will be improved by the installation of a 12-H.P. Fairbanks-Morse kerosene engine, triplex pump, Clayton compressors, and other machinery parts, which were purchased from the General Supply Co. of Canada, Ltd., of Ottawa, Ont., for \$1,596. A coal and oil shed was also built, and foundations prepared for the new fog alarm building to be erected next season. The work was done by day's labour, at a cost of \$6,995.75.

Cape Bauld.—The new circular cast-iron lighthouse tower, in course of construction last year, was completed, and the illuminating apparatus placed thereon. A new brick chimney was added to lightkeeper's dwelling house, and minor repairs made to the fog alarm building. The work was done by day's labour, at a cost of \$3,255.32.

Cape Norman.—The new double dwelling for the lightkeeper and fog alarm engineer, in course of construction last year, was completed. The old lighthouse tower was razed to the first floor and converted into a storehouse; the fog alarm reservoir was repaired and the building drained. The work was done by day labour, at a cost of \$6,008.72.

Point Rich.—It was found necessary, in order to carry the new heavy illuminating apparatus, to build concrete foundations, on which wooden framework was erected, and carried up all around the outside of the lighthouse tower. The old lantern platform was then removed and new wall plates, &c. laid. A wooden dwelling for the lightkeeper was also erected. The work was done by day's labour, at a cost of \$8,170.05.

Cape Ray.—Repairs were made to the lightkeeper's dwelling house, and a wooden fence constructed around it. The foundations of the coal shed were strengthened, and a trench dug to drain water from fog alarm building. The work was done by day's labour, at a cost of \$2,166.11.

Bird Rocks.—The lighthouse tower was reinforced in concrete and increased 12 feet in height, to clear the obstruction caused by the new fog alarm building. An oil shed, blacksmith shop, and stables were also erected; the work was done by day's labour, at a cost of \$4,493.61.

Heath Point.—The lighthouse tower was increased 30 feet in height, in reinforced concrete, and the extension sheathed in wood. The height of the tower is now 133 feet from base to top of ventilator on lantern. The work was performed by contract, by The Steel Concrete Company, of Montreal, for \$6,095. The tower was hardly completed, however, when a heavy storm damaged the greater part of the sheathing on the old portion of the building, which necessitated resheathing and repainting the tower. The tower was further strengthened by fastening the concrete and stonework together by iron hoops. The repairs and improvements were carried out by contract, by The Steel Concrete Company, of Montreal, for \$2,350.

Cape Rosier.—The lightkeeper's dwelling house was thoroughly repaired, and water piping laid; the work being done by day's labour, at a cost of \$2,403.17.

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Cape Magdalen.—The new 3-inch diaphone plant, purchased last year, was installed, and replaces the fog whistle formerly in operation. The work of installation was performed by day's labour, at a cost of \$1,218.99.

Rivière à la Martre.—The lightkeeper's dwelling house was thoroughly repaired, and a new coal and oil shed erected. The work was done by day's labour, at a cost of \$1,691.92.

Father Point.—A new lighthouse tower was erected. It is a reinforced concrete structure, octagonal in plan, reinforced by eight flying buttresses, and surmounted by a circular metal lantern. The tower is 97 feet high from base to vane on lantern, and the light is elevated 91 feet above high water, and visible fifteen miles from all points of approach seaward. The tower was erected by day's labour, at a cost of \$5,855.58.

Bicquette.—A new wooden fog-alarm building, rectangular in plan, was erected, and a 3-inch duplicate diaphone plant installed, which supersedes the steam horn formerly in operation. The diaphone plant was purchased from the Canadian Fog Signal Company, of Toronto, for \$8,500; the fog-alarm building being erected, and the machinery installed by day's labour, at a cost of \$6,662.41, which amount also includes repairs to the lightkeeper's dwelling house.

River Valin.—Two range lighthouse towers were erected, to take the place of masts formerly used to carry lights. The front tower is a wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, and is 32 feet high from base to top of ventilator on lantern. The back tower is a 4-section steel skeleton structure, square in plan, with sloping sides, surmounted by an enclosed wooden watchroom and square wooden lantern. It is 64 feet high from base to top of ventilator on lantern. The front tower was erected by contract, by Mr. N. Warren, of Chicoutimi, P.Q., for \$570. The back tower was purchased from the Goold, Shapley, Muir Company, of Brantford, Ont., for \$540, and erected by day's labour, at a cost of \$1,546.68, which includes cost of cutting trees and clearing land around front lighthouse.

Pilgrims.—A new dwelling house was erected for the lightkeeper, the work being done by day's labour, at a cost of \$3,534.62.

In addition to the above, minor expenditures were incurred at stations as follows:

Brandy Pots, building shed.	\$272 05
Pte. à Bastille, tower repairs.	358 12
Domaine, payment for sites, &c.	212 30
Hospital Rock, for sites, &c.	163 69
Little Metis, repairs.	341 99

MONTREAL AGENCY.

LIGHT DISCONTINUED.

Ile à la Pierre.—The light formerly maintained on the pier was permanently discontinued.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Batiscan.—The range lights were moved to new positions, in the axis of the widened and improved channel. A new concrete pier was constructed for the front light. It is 40 feet square at bottom, with battered sides, and is surmounted by a small octagonal iron lantern. A new 3-section steel skeleton tower was provided for the back light. It is square in plan, with sloping sides, surmounted by an inclosed wooden watchroom and square wooden lantern. It is 62 feet high from base to top of ventilator on lantern. The work was done by day labour, at a cost of \$9,832.26.

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Port St. Francis.—The steel skeleton tower, from which the back range light is shown, in course of construction last year, was completed by day's labour, at a cost this season of \$1,110.97.

No. 2 Curve, Lake St. Peter.—The rebuilding of piers, which was in progress last year, was completed. Both piers were strengthened by reinforced concrete and steel bars, and a concrete nosing built on upstream end of back pier; a large quantity of stone ballast being filled in around them. The middle pier was rebuilt in concrete to a height of 8 feet above low water, and stone ballast filled in around it. Cast-iron anchor locks were sunk in cement for holding anchors of steel tower which will be erected during the coming season. The work was done by day's labour, at a cost during the present season of \$74,080.46.

Gallia Bay.—Owing to the soft bottom at the sites, the front and back piers of the upper range and the front pier of the lower range settled unevenly. Pilework was driven in around them, the old concrete work picked and reinforced with steel bars, a reinforced concrete belt, 2 feet thick, placed around pilework, and heavy boulders piled around outside of all, to act as a further protection. The work was done by day's labour at a cost of \$6,775.58.

Ile de Grace.—The water having undermined the front pier, pilework was driven around it and riprap placed between piles. The work was done by day's labour at a cost of \$537.30.

Ste. Anne de Sorel.—The water having undermined the front pier, pilework was driven around it and riprap placed between piles. The work was done by day labour at a cost of \$1,193.35.

Sorel.—Water piping and fixtures were laid from the water works to the government wharf and buildings, the work being done by contract, by Mr. W. Coté, of Sorel, P.Q., for \$1,290.

Ile Deslauriers.—A new 4-section steel skeleton tower was erected to replace the back range tower of this range, on the eastern shore of Ile Ste. Thérèse, for the purpose of increasing the difference in height between the front and back light. It is square in plan, with sloping sides, surmounted by an inclosed wooden watch-room and square wooden lantern. The tower is 82 feet high from base to top of ventilator on lantern, and was purchased from the Goold, Shapley & Muir Company, of Brantford, Ont., for \$668.50. It was erected by day's labour at a cost of \$704.76. The old three-section tower has been taken down and will be utilized elsewhere.

Ile à la Bague.—The old octagonal wooden lighthouse tower was pulled down and a new two-section steel skeleton tower erected. It is square in plan, with sloping sides, surmounted by an octagonal wooden lantern, and stands on a square concrete pier with battered sides. This tower was formerly in use at Port St. Francis and is designed for removal every winter. The work was done by day labour at a cost of \$1,107.60.

Varennnes.—The concrete wall supporting the steel tower of the back light became unstable, seriously endangering the stability of the tower. Temporary repairs were, therefore, carried out to hold the tower sufficiently until next season, when repairs of a more permanent character will be executed. The work was done by day's labour at a cost of \$946.95.

In addition to the above, minor repairs were executed at the following stations:—

Guard pier, shelter shed.	\$ 84 39
Ile aux Raisins, repairs to dwellings.	66 00
Lake St. Peter lightship, repairs.	96 64
Pointe du Lac, purchase of site.	75 00
Repentigny, repairs to back tower.	183 75

ONTARIO.

NEW AIDS TO NAVIGATION.

Rideau Canal.—Lights and day beacons were established on several stretches of the Rideau canal, as follows: 20 lights on River Styx, 10 above Poonamalee, and 4 at Chaffey lock, 13 tripod day beacons below Catchall island, and 4 at Mud island. The lights are exhibited from hand lanterns hung inside tripods at an elevation of from 4 to 6 feet above the water. The lanterns on the starboard hand show fixed red lights, and those on the port hand fixed white, visible at least half a mile in all directions except where obscured by the legs of the tripods. The tripods consist of cedar poles driven in shallow water, with the heads bound together. The tripods were supplied by contract by the Rideau Lakes Navigation Company, Ltd., of Kingston, Ont., for \$1,942.25, which amount included the placing of the lights in their proper positions.

Port Stanley.—A reinforced steel concrete tower is in course of erection on the government breakwater, the work being done by contract by Mr. F. R. Miller, of Port Stanley, Ont., for \$3,850.

Chenal Ecarté.—Two range lights were established on the northern end of Walpole island to lead into this channel. The lights are fixed white, shown from pressed lens lanterns hoisted on poles. The front pole is 8 and the back pole 20 feet high, with small shed attached. The work was done by day's labour at a cost of \$248.46.

Flowerpot Island.—A fog-alarm was established at this light station. It consists of a 4-h.p. standard 1½-inch diaphone plant, purchased from the Canadian Fog Signal Company, of Toronto, for \$2,400. A rectangular wooden fog-alarm building was erected by day's labour, and, with the installation of machinery, cost \$2,010.65.

Hope Island.—The 3-inch duplicate diaphone plant, purchased last year, was installed by day labour, at a cost of \$1,647.40.

Parry Sound.—The departmental wharf for the storing of buoys, &c., and berthing of government steamers, in course of construction last year, was completed, the work being done by contract, by Messrs. Pratt & McDougall, of Midland, Ont., for \$39,700. In addition to above, the ground alongside the departmental agency building was filled in, the work extending some 50 feet into the water, and a small railroad track laid for the purpose of transporting material about the wharf and store. The work was done by day labour at a cost of \$6,046.58.

Spruce Shoal.—The reinforced concrete beacon, in course of construction last year, was completed, the work being done by contract, by Mr. T. A. White, of Parry Sound, Ont., for \$13,373.38. The beacon is octagonal in plan, sloping up from the water to a central tower which holds a gas tank surmounted by a small steel frame with lens lantern; the height of gallery of tower above water is 21 feet.

Point Porphyry.—The installation of the new 3-inch duplicate diaphone plant with two 6-h.p. kerosene engines was completed by day's labour at a cost of \$294.84.

Welcome Islands.—The new 1½-inch diaphone plant was installed by day's labour, at a cost of \$402.85.

LIGHTS DISCONTINUED.

Britannia.—The light formerly maintained on the Electric Railway Company's pier was permanently discontinued.

East Neebish.—The upper range lights formerly maintained in the eastern channel of River St. Mary were permanently discontinued.

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Footes Dock.—The fixed red light formerly maintained on this dock was permanently discontinued.

Goderich.—The fixed green light formerly shown on the north pier was permanently discontinued.

Meaford.—The fixed white light formerly shown from a lantern on a pole, on outer end of east pier, was permanently discontinued.

Weller Bay.—The back range light, at southwestern end of Quinte carrying place, was permanently discontinued.

CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Nine-Mile Point.—Alterations were made to the fog alarm boiler room to accommodate an extra 25-h.p. Robb-Mumford boiler, which was installed. A reinforced concrete chimney was erected at the fog alarm building; repairs made to breakwater, and drainage improvements executed to dwelling house of fog alarm engineer. The work was done by day's labour, at a cost of \$2,108.11.

Pigeon Island.—The old combined lighthouse and dwelling was pulled down and replaced by a specially designed 4-section steel skeleton tower, and a separate dwelling. The new tower is square in plan, with sloping sides, surmounted by an inclosed wooden watchroom, and has a spiral staircase, inclosed in cylindrical steel form, constructed from base of tower to watchroom floor. The new dwelling house is a neat wooden building. A new boathouse was also built, as well as cribwork protection work. The steel tower was purchased from the Goold, Shapley & Muir Co., of Brantford, Ont., for \$1,677, and the construction work was carried out by day's labour at a cost of \$3,591.84.

Wicked Point.—Two hundred feet of cribwork was constructed at the northwest end of breakwater, and the breakwater repaired. Minor repairs were also executed to lighthouse tower and keeper's dwelling. The work was done by day's labour at a cost of \$788.95.

Toronto.—A wooden dwelling house was erected for the fog alarm engineer at the East gap station; the work being done by contract, by Messrs. J. D. Young & Son, of Toronto, for \$3,295.78. Protection work was also executed at the east breakwater to ensure the safety of the fog alarm building. The work was done by day's labour, at a cost of \$214.75.

Port Dalhousie.—The back light pier was repaired and foundations of lighthouse tower renovated. The work was done by day labour, at a cost of \$801.25.

Port Colborne.—The interior of the fog alarm building was sheathed, and a wooden floor laid; an oil shed was erected, and some machinery fittings supplied to the fog alarm plant. The work was done by day labour, at a cost of \$713.98.

Stag Island.—A lighthouse tower was erected on the southern end of Stag island shoal, replacing the pole light formerly exhibited. It is a wooden building, square in plan, with sloping sides, surmounted by a square wooden lantern, and is 22 feet high from base to top of ventilator on lantern. The tower stands upon a reinforced concrete pier, square in plan, with battered sides. The work was done by day's labour, at a cost of \$3,403.06. (See illustration.)

Goderich.—The pole and lantern from which the back range light was formerly exhibited were replaced by a 3-section steel skeleton tower. It is square in plan, with sloping sides, surmounted by an inclosed wooden watchroom and square wooden lantern, and is 64 feet high from base to top of ventilator on lantern. The tower was purchased from the Goold, Shapley & Muir Co., of Brantford, Ont., for \$502.80,

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and was erected by day's labour, at a cost of \$686.11. An oil shed was also erected by day's labour, at a cost of \$97.54.

Cabot Head.—The fog alarm building and plant were destroyed by fire, in August, 1907. A new wooden rectangular fog alarm building was, therefore, erected, and a duplicate 12-h. p. 3-inch diaphone plant, purchased from the Canadian Fog Signal Company, of Toronto, for \$8,100, installed. The fog alarm building was erected by contract, by Mr. J. C. Kennedy, of Owen Sound, Ont., for \$2,463.

Cape Croker.—A new lighthouse tower was erected. It is an octagonal reinforced concrete structure, surmounted by a circular metal lantern, and is 53 feet high from base to vane on lantern. The work was done by contract, by The Forest City Paving and Construction Company, of London, Ont., for \$1,820.

Owen Sound.—Two new range lighthouse towers were erected, both towers being steel skeleton structures, square in plan, with sloping sides, surmounted by inclosed wooden watchrooms and octagonal iron lanterns. The front tower is 50 feet high from base to top of vane on lantern, and was formerly in use at Point au Baril. The back tower (see illustration) is 82 feet high from base to top of vane on lantern, and was purchased from the Goold, Shapley, Muir Company, of Brantford, Ont., for \$668.50. The towers were erected by day's labour, at a cost of \$1,637.86.

Point au Baril.—The old back lighthouse tower was taken down and removed to Owen Sound, where it now forms the front tower of that range. It was replaced by a new 4-section steel skeleton tower, square in plan, with sloping sides, surmounted by an inclosed wooden watchroom and square wooden lantern, and has the side of the framework facing the channel covered with wooden slatwork. The lantern is painted white; and the watchroom and slats are painted white with a vertical black stripe on the front face. The height of the tower from its base to the ventilator in the lantern is 81 feet. The fixed red catoptric light is elevated 93 feet above the water, and should be visible ten miles. The work was done under contract by Mr. Geo. W. White, of Parry Sound, at a cost of \$570. The steel framework of the lighthouse was provided under contract by the Goold, Shapley, Muir Company, of Brantford, for \$668.50. The total cost of the work to date was \$1,237.

The higher tower was erected here because it was difficult to see the old light when approaching outside the reefs lining the channel in from Georgian bay, and a higher light could be seen over the point of woods and more easily aligned with the front light.

Sailors Encampment.—The two range mast lights were replaced by inclosed wooden towers, square in plan, with sloping sides, surmounted by square wooden lanterns, each tower being 33 feet high from base to the top of ventilator on lantern. The work was done by day's labour, at a cost of \$1,686.71.

Coppermine Point.—A new lighthouse tower was erected, replacing the lantern on open framed pyramid formerly exhibited. It is a wooden building, square in plan, with sloping sides, surmounted by an octagonal iron lantern, and is 32 feet high from base to top of ventilator on lantern. The tower was erected by contract, by Mr. J. C. Kennedy, of Owen Sound, Ont., for \$1,200.

In addition to the above, minor repairs were executed at the following stations:—

Buckom Point, new pier.	\$350 00
Collingwood, boathouse.	317 58
Fort William, temporary pole lights.	322 02
Lonely Island, tower repairs.	351 16
Port Burwell, tower repairs.	113 62

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Red Rock, tower repairs.	243 66
Thessalon, oil store.	212 79
Victoria Island, tower repairs.	284 30
West Sister Rock, repairs to dwelling.	298 94
Thames River, boathouse.	250 00
Shoal Point, tower repairs.	197 51

BRITISH COLUMBIA.

NEW AIDS TO NAVIGATION.

Estevan Point.—A 5-inch duplicate 12-horse-power diaphone plant, purchased from the Canadian Fog Signal Company, of Toronto, for \$12,500, was installed in the new fog-alarm building erected last year. A 100-foot reinforced steel concrete light-house tower will be erected next season, and a portion of the steel and other material for this have already been purchased. The work is being done by day's labour, and the expenditure this year, exclusive of cost of diaphone plant, was \$5,833.35.

Cape Beale.—The 3-inch duplicate diaphone plant, purchased last year, was installed, the work being done by day labour, at a cost of \$523.44.

West Coast Trails.—Last year a special appropriation was made in the departmental estimates for establishing and maintaining life saving stations and constructing a pack-horse trail along the west shore of Vancouver Island, between Barkley sound and Port San Juan, and about twenty-two miles of trail were completed. This year the work was continued and the trail extended a farther distance of about eight miles. Owing to the great depth of vegetable matter lying under several portions of the trail cut last year, the road became so soft in places during wet weather that pack horses were unable to travel over it. The trail was, therefore, gone over again, and, wherever necessary, an extra bedding of brush and gravel was laid to remedy the defect. The route of the trail follows the coast line generally, but occasionally strikes off inland where necessary to avoid rocky country or ground over which a trail could not be constructed. The work is being done by day's labour, and the total expenditure to date has been \$93,446.65.

Scarlett Point.—A fog-bell was established. It is suspended in a small wooden tower which was erected by day's labour, at a cost of \$269.75.

Ivory Island.—The installation of the 1½-inch diaphone plant was completed, and several extra fittings and spare parts supplied; the work being done by day's labour, and the total expenditure being \$2,222.39.

Gas-lighted Beacons.—Gas-lighted beacons were established by the Commissioner of Lights' Branch at the following places:—(1) Look-out Island, Halibut channel; (2) Helen point, Mayne island; (3) Walker rock, Trincomali channel; (4) Coffin islet, Oyster harbour; (5) First Narrows, Burrard inlet; (6) White islet, Seechelt peninsula; (7) Ragged island, Lund; (8) Chatham point, Discovery passage. These beacons consist of steel cylindrical tanks, standing on steel framework, surmounted by pyramidal steel frames supporting lanterns. The illuminant is acetylene, generated automatically, and the lights are unwatched lights. No special account was kept of the actual cost of each of these beacons, as the labour on them was performed by the crews of the C.G.S. *Quadra* and the hired steamer *Cascade*, as opportunity offered, and took a longer or shorter time as local conditions prevailed. The cost is, therefore, partly included in the payments made for the steamer *Cascade* and in the wages of the crew of the *Quadra*, but the cost of the materials used in the construction of these beacons was \$1,623.44.

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CHANGES AND IMPROVEMENTS IN EXISTING AIDS.

Lennard Island.—Repairs and improvements were executed to the fog-alarm building; the work being done by day's labour, at a cost of \$742.58.

Trial Island.—A new lantern platform was erected on the light house tower and an improved lantern erected, the work being done by day's labour at a cost of \$356.64.

In addition to the above, minor repairs were executed at the following stations:—

Ballenas Islands, machinery fittings.	\$51 22
Pine Island, clearing land.	60 00
Sisters Island, machinery fittings.	51 22
Yellow Island, machinery fittings.	51 22

The whole respectfully submitted.

WM. P. ANDERSON, M. Inst. C.E.,
Chief Engineer.

Chief Engineer's Office,
Department of Marine and Fisheries,
Ottawa, Canada, April 1, 1909.

APPENDIX No. 2.

ANNUAL REPORT OF THE COMMISSIONER OF LIGHTS BRANCH.

To the Acting Deputy Minister of Marine and Fisheries.

SIR,—I have the honour to submit the sixth annual report of this branch. The principal work performed has been the substitution of modern dioptric apparatus in a number of major coast lights, the improvement of minor coast lights by the installation of petroleum vapour as an illuminant, an extension of the gas buoy and beacon service throughout the various provinces and the maintenance of lights and other aids to navigation throughout the Dominion, together with the installation of what new apparatus was required at new stations.

The gas buoys and beacons have given general satisfaction. Two losses have occurred with regard to gas buoys, one in New Brunswick and one in Ontario. In the New Brunswick district, a No. 11 gas and whistling buoy, serial No. 575, which was stationed at Northwest Ledge, Brier island, broke from its moorings and drifted ashore. The lantern and superstructure were saved, but the buoy sank in three fathoms of water. It is hoped that the buoy can be recovered and repaired. In Ontario a No. 11 gas whistling buoy, serial No. 569, which was stationed at Lone Rock, Georgian bay, disappeared during a storm on November 15, 1908, and has not been recovered.

The submarine bells have given excellent service. When these aids to navigation were first established, some difficulty was experienced in obtaining a serviceable bell, but an improved type of bell was established in the summer of 1907. These bells have been in service since that time and have not required any attention though the submarine cable leading to one of the bells at Negro Head, N.B., failed. This cable will be raised and repaired as soon as weather permits. Four shore stations are in operation—Negro Head, Yarmouth, Chebucto Head and Louisburg—and five lightship stations—Lurcher, Anticosti, White island, Red island and Prince Shoal.

In the Nova Scotia agency the *Lady Laurier* and *Aberdeen* have been in use in connection with the lighthouse and buoy service. The buoys on the Bay of Fundy coast of Nova Scotia, from Cape Sable inward, are under the control of the New Brunswick agency.

In the New Brunswick agency, it has not yet been possible to provide a permanent base of operations but it is hoped that this will be accomplished in the near future. Owing to the large amount of work to be carried out, it was necessary to utilize the services of the chartered steamer *Restigouche* for some time in connection with buoy work.

In the Prince Edward Island agency the C.G.S. *Brant* is useful in delivering lighthouse supplies, but is not large enough to handle the larger buoys. The gas buoys were placed in the spring by the *Stanley* and raised in the fall by the *Aberdeen*.

In the Quebec agency facilities for handling lighthouse supplies and buoys are satisfactory. The whistling buoy and bell buoy at the Magdalen islands, which have hitherto been under the control of the Quebec agency, have been put under the care of the Prince Edward Island agency, and a suitable derrick has been erected on the government wharf at Grindstone island for the purpose of handling the buoys.

The Dominion lighthouse depot at Prescott still continues to be an establishment of great usefulness. From the depot is administered the buoy service between Montreal and Kingston. The depot is also a distributing point for apparatus throughout the Dominion, likewise a manufacturing centre for lighthouse apparatus of a special nature. Photometric and other tests are performed from time to time in order to

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determine the usefulness of new apparatus or to establish a comparison between various types of apparatus. In connection with the experimenting and manufacturing work, an important advance has been made in the development of a revolving mercurial joint, which makes possible the use of petroleum vapour as an illuminant in conjunction with revolving reflectors. By this means a light of as high power as 48,000 candles can be manufactured at a moderate cost. See plates 1 and 2. Plate 1 shows an elevation of a high power catoptric revolving light in a lantern 10 feet diameter. This arrangement has been rendered successful by the use of the high pressure frictionless mercurial joint shown in plate 2. This revolving joint differs entirely from the familiar mercury seal in that it consists of a series of annular cells containing mercury, the pressure being transmitted outward from one cell to the next through the medium of another liquid of low specific gravity (oil) until the pressure is reduced to atmospheric. A 'six-series' joint, two feet long, is approximately equivalent to an ordinary mercury seal 12 feet long.

The work in the Parry Sound agency consists particularly in the maintenance of the gas buoys and acetylene lights on the Georgian bay. The service is handled by the aid of a derrick scow and chartered tug. The construction of a suitable steamer for this agency is nearing completion in England and it is expected that she will reach Parry Sound in the course of two months. This steamer will be available for handling lighthouse supplies for the Ontario district. Hitherto these supplies have been delivered by chartered vessels..

In the British Columbia agency, there has been considerable development. Hitherto only one vessel, the C.G.S. *Quadra*, has been available and owing to the extensive coast line has proved entirely inadequate. For this reason, it was necessary to charter other vessels for various periods of time. The derrick scow is a useful auxiliary and especially so now that the *Newington* has been purchased for service in this agency. By reason of the extensive coast line and the rapidly increasing service, the day is not far distant when it will be necessary to add another steamer to the department's fleet in British Columbia.

Please find herewith inclosures as follow:—

Inclosure 1. Statement by provinces showing new aids to navigation established throughout the Dominion, also improvements effected in existing lights in the fiscal year 1908-9.

Inclosure 2. Statement by provinces showing the number of lightstations, lights, fog alarms and warning buoys in service during the fiscal year 1908-9.

Inclosure 3. Statement by divisions showing the number of gas buoys in service throughout the Dominion during the fiscal year 1908-9.

Inclosure 4. Statement giving complete list of stations at which gas buoys were in operation throughout the Dominion during the fiscal year 1908-9.

Inclosure 5. Outline chart Atlantic coast of Canada showing quick flashing lights of the hyper-radial, 1st order, 2nd order, 3rd order, 3rd order small model and 4th order in operation during the fiscal year 1908-9.

In conclusion, I desire to express and record my appreciation of the able assistance rendered by my staff and the untiring application to duty exhibited by each member. It would not have been possible to carry out the large and increasing amount of work which is devolving upon this branch without the co-operation of all the officers connected with it.

I have the honour to be, sir,
Your obedient servant,

J. G. MACPHAIL,
Acting Commissioner of Lights.

Commissioner of Lights Office,
Department of Marine and Fisheries, Canada.

March 31, 1909.

INCLOSURE NO. 1.

Statement by provinces showing new aids to navigation established throughout the Dominion, also improvements effected in existing aids during the fiscal year 1908-9.

NOVA SCOTIA.

New Lights.

Amherst Point.—360° 5th order French lens with brass stand and ring, duplex lamp.

Biglow Point, Pugwash Harbour, Front Light.—240° Chance lens with brass plate and support and Diamond gas automatic occulting machine.

Biglow Point, Pugwash Harbour, Back Light.—Constant level lamp with 20-inch silvered copper reflector.

Eatonville.—5th order 360° French lens with brass stand and ring and duplex lamp.

Maitland.—360° Chance anchor lantern.

Mitchener Point.—360° 5th order French lens with brass stand and ring, duplex lamp.

Stevens Point, Pugwash Harbour, Front Light.—Constant level lamp and reflector.

Stevens Point, Pugwash Harbour, Back Light.—Constant level lamp and 20-inch silvered copper reflector.

Improvements.

Beach Point, Pubnico Harbour.—A 4th order dioptric occulting white light and new lantern, visible for six seconds and eclipsed for four seconds, alternately, has been substituted for the fixed white, 7th order dioptric light. The illuminant is petroleum vapour burned under an incandescent mantle.

Cape Fourchu.—A 2nd order dioptric single flashing light and lantern, giving one flash every two and one-half seconds, thus:—

Flash.. . . . .	.25 seconds.
Eclipse..	2.25 "

replaces the revolving white catoptric light. The illuminant is petroleum vapour burned under an incandescent mantle. Candle power 270,000.

Cape George, Northumberland Strait.—The Catoptric revolving white light has been discontinued and replaced by a third order dioptric triple flashing light having the following characteristic:—

Flash.. . . . .	.25 seconds.
Eclipse..	1.00 "
Flash.. . . . .	.25 "
Eclipse..	1.00 "
Flash.. . . . .	.25 "
Eclipse..	4.75 "

The total period being 7.50 seconds. The illuminant is petroleum vapour burned under an incandescent mantle. Candle power, 55,000.

Little Hope.—A 2nd order dioptric double flashing light and lantern has been erected in the new tower, replacing the dioptric 6th order occulting white light which

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was placed temporarily. The light is flashing white, having the following characteristic:—

Flash.. . . . .	.4 seconds.
Eclipse..	1.6 “
Flash.. . . . .	.4 “
Eclipse..	7.6 “

The illuminant is petroleum vapour burned under an incandescent mantle. Candle-power 270,000.

St. Paul's Island, S.W.—A 55 mm. Diamond vapour installation and adjustable brass stand replaces the duplex lamp.

Sambro.—An 85 mm. Chance vapour installation replaces the acetylene light.

Low Point, Sydney Harbour.—The fixed white catoptric light has been replaced by a 3rd order double flashing light and lantern, showing two bright flashes of .25 seconds duration, separated by an eclipse of .75 seconds, followed by an eclipse of 3.75 seconds, the total period being 5 seconds, thus:—

Flash.. . . . .	.25 seconds.
Eclipse.. . . . .	.75 “
Flash.. . . . .	.25 “
Eclipse..	3.75 “

The illuminant is petroleum vapour burned under an incandescent mantle. Candle power, 100,000.

Westport.—The catoptric fixed white light has been replaced by a 5th order 360° Chance lens and 25 mm. Diamond vapour installation with brass and iron stand.

Wilmot Bluff.—A 5th order fixed white light supersedes the old catoptric light.

Gas Buoy Services.

The following new buoys have been placed:—

Low Point, Liverpool Harbour.—Gas and bell buoy.

Pubnico.—Gas and whistling buoy.

Shelbourne.—Gas and whistling buoy.

Sydney.—Gas and whistling buoy.

South East Bay, Sydney Harbour.—Gas buoy.

Other Aids to Navigation.

Berry Head.—Hand fog horn.

Bon Portage Island.—The bell buoy hitherto maintained at this point has been superseded by a whistling buoy.

Horseshoe Ledge, St. Margaret Bay.—Bell buoy established.

Fishery Point, Sheet Harbour Passage.—Bell buoy established.

Kingsport.—Hand fog horn.

Lockwood Rock, South Coast.—Whistling buoy.

McMillan Point.—Hand fog-horn.

Mad Dick Shoal, Main-à-Dieu Bay.—A bell buoy replaces the steel conical buoy heretofore moored at this point.

Malone Shoal, Spry Bay.—Iron can buoy.

Mad Moll Reef, Spry Bay.—Iron conical buoy.

Musquodoboit Shoal, off Harbour Island.—Whistling buoy. Iron can buoy has been established half-mile s. 62 w. from Harbour island.

Nixonmate Shoal.—Bell buoy.

Port Latour.—Fairway bell buoy.

Stonehouse.—Iron can buoy.

NEW BRUNSWICK.

New Lights.

Fort Moncton.—7th order 240° Chance lens and brass stand with duplex lamp.

Kouchibouguac Ranges.—Front light, anchor lantern; back light, anchor lantern; front light, anchor lantern; back light, anchor lantern.

Portage Island.—240° Chance anchor lantern.

Reid Point.—240° Chance anchor lantern.

Richibucto, Front Light.—180° Chance anchor lantern.

Richibucto, Back Light.—180° Chance anchor lantern.

Improvements.

Escuminac.—A 55 mm. Diamond vapour installation replaces the duplex lamp.

Caraquet.—The catoptric light has been replaced by a 360° 5th order French lens, and 25 mm. Diamond vapour installation.

Heron Island, Chaleur Bay.—A new lantern and 5th order 360° French lens and a petroleum vapour light has been substituted for the catoptric apparatus heretofore in use.

McMann Point.—6th order dioptric illuminating apparatus replaces the catoptric light.

Machias, Seal Island, near middle of island.—A 55 mm. Diamond vapour installation replaces the duplex lamp.

Machias, Seal Island, S.E. from North Northwesterly light.—A 55 mm. Diamond vapour installation replaces the duplex lamp.

Miscou Island, Chaleur Bay.—A 3rd order dioptric double flashing light and lantern superseded the group revolving white catoptric light. The new light gives two flashes every 7½ seconds, thus:—

Flash. . . . .	.5	seconds.
Eclipse.	1.00	"
Flash. . . . .	.5	"
Eclipse.	5.5	"

The illumination is petroleum vapour burned under an incandescent mantle. Candle power, 100,000.

Pecks Point, Chicgnecto Channel.—The lighthouse formerly at Wards point has been moved here and a 7th order dioptric fixed white light has been established.

Portage Island, Miramichi Bay.—A 4th order dioptric occulting white light and new lantern replaces the old fixed white catoptric light. The new light is visible for 7 seconds with an eclipse of two seconds alternately. The illuminant is petroleum vapour burned under an incandescent mantle.

Swallowtail, Grand Manan.—The 4th order dioptric fixed white light has been replaced with a 4th order dioptric occulting white light, visible for 4 seconds and eclipsed for 2 seconds alternately. The illuminant is petroleum vapour burned under an incandescent mantle.

Other Aids to Navigation.

Cranberry Point, Lepreau Bay.—A bell buoy replaces the spar buoy heretofore moored at this point.

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Prangle Point, Whitehead Island.—A bell buoy replaces the black can buoy hitherto moored at this point.

Gas Buoy Service.

The following new buoys have been placed:—

Quaco Ledge.—Gas and whistling buoy.

Young's Point, Caraquet River.—Gas buoy.

Grassy Point, Caraquet River.—Gas buoy.

PRINCE EDWARD ISLAND.

Improvements.

Blockhouse Point.—The catoptric light heretofore in operation has been replaced by a 360° 4th order French lens, and 35 mm. Diamond vapour installation with adjustable brass and iron stand.

Brighton Beach, Front Light.—A 25 mm. Diamond vapour installation replaces the duplex lamp formerly used.

Brighton Beach, Back Light.—A 25 mm. Diamond vapour installation replaces the duplex lamp formerly used.

Cascumpeque.—A 35 mm. Diamond vapour installation and adjustable brass stand replaces the duplex lamp formerly used.

Fish Island, Main Light.—A 35 mm. Diamond vapour installation and adjustable brass stand replaces the duplex lamp formerly used.

Indian Point.—A 35 mm. Diamond vapour installation replaces the duplex lamp formerly used.

Point Prim.—The catoptric light has been superseded by a 4th order 360° Chance lens and 25 mm. Diamond vapour installation with brass and iron stand.

Souris, East.—A 35 mm. Diamond vapour installation replaces the duplex lamp formerly used.

QUEBEC.

New Aids.

Bonaventure.—360° Chance anchor lantern.

Cape Chat Wharf.—360° Chance anchor lantern.

English Bay.—5th order 270° French lens, with brass and iron stands, and a 25 mm. Diamond vapour installation.

L'Île, Bonaventure.—240° Chance anchor lantern.

New Richmond.—360° Chance anchor lantern.

Percé Wharf.—180° Chance anchor lantern.

St. Godfrey.—240° Chance anchor lantern.

Three Rivers, Front Light.—4th order French lens and capillary lamp.

Three Rivers, Back Light.—4th order French lens and capillary lamp.

Cape Anguille, Newfoundland.—3rd order dioptric double flashing light and lantern has been erected at this point. The light is flashing white, showing a group of two flashes every ten seconds, thus:—

Flash. . . . .	.525	seconds.
Eclipse.	1.350	"
Flash. . . . .	.525	"
Eclipse.	7.600	"

The illuminant is petroleum vapour burned under an incandescent mantle. Candle power 100,000.

IMPROVEMENTS.

Batiscan, Back Light.—Constant level lamp and 20-inch silvered copper reflector.

Batiscan, Back Light.—Constant level lamp and 20-inch silvered copper reflector.

Brandy Pots.—A 35 mm. Diamond vapour installation and adjustable brass stand replaces the duplex lamp heretofore used.

Cap-au-Oies.—The catoptric fixed white light has been replaced by an occulting white light, visible for ten seconds and eclipsed for five, alternately. The apparatus is dioptric of the 4th order. The illuminant being petroleum vapour burned under an incandescent mantle.

Cape Magdalen, Gaspé Co.—A 3rd order dioptric triple flashing light and lantern has been erected on the new tower, the light is flashing white showing three bright flashes at intervals of six seconds, followed by an interval of $17\frac{1}{2}$ seconds, thus:—

Flash.. . . .	.5 seconds.
Eclipse.. . . .	5.5 "
Flash.. . . .	.5 "
Eclipse.. . . .	5.5 "
Flash.. . . .	.5 "
Eclipse.. . . .	17.5 "

Complete revolution, 30 seconds. The illuminant is petroleum vapour burned under an incandescent mantle. Candle power, 55,000.

Deslauriers.—Constant level lamp with 24-inch silvered copper reflector.

Entry Island.—The fixed white light heretofore shown at this point has been changed to a 4th order dioptric occulting white light, visible for four seconds and eclipsed for six seconds alternately. The illuminant is petroleum vapour burned under an incandescent mantle.

Heath Point, Anticosti.—A first order dioptric single flashing light and lantern has been erected at this point, replacing the catoptric fixed white light heretofore exhibited. The characteristic is as follows:—

Flash.. . . .	.21 seconds.
Eclipse.. . . .	7.29 "

The illuminant is petroleum vapour burned under an incandescent mantle. Candle power, 500,000.

Little Metis.—The old alternating red and white catoptric light has been superseded by a 3rd order dioptric flashing white light, showing a group of three bright flashes every $7\frac{1}{2}$ seconds, thus:—

Flash.. . . .	.25 seconds.
Eclipse.. . . .	1.00 "
Flash.. . . .	.25 "
Eclipse.. . . .	1.00 "
Flash.. . . .	.25 "
Eclipse.. . . .	4.75 "

The illuminant is petroleum vapour burned under an incandescent mantle. Candle power 55,000.

Rivière Valin, Front Light.—A 7th order 120° Chance lens with duplex lamp replaces the catoptric light formerly exhibited.

Rivière Valin, Back Light.—A constant level lamp with 20-inch silvered copper reflector.

South Traverse, (Temporary).—360° Chance anchor lantern.

West Point, Anticosti.—A 55 mm. Diamond vapour installation and adjustable brass stand replaces the duplex lamp used heretofore.

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Belle Isle, Newfoundland, High Light.—The fixed white light has been changed to an occulting white light, visible for five seconds and eclipsed for five seconds alternately. The illuminant is petroleum vapour burned under an incandescent mantle.

Belle Isle, Newfoundland, Low Light.—The fixed catoptric light has been changed to an occulting white light, visible for 5 seconds and eclipsed for 5 seconds alternately. The apparatus and lantern being of the 2nd order dioptric. The illuminant is petroleum vapour burned under an incandescent mantle.

Cape Bauld, Newfonudland.—A 2nd order dioptric double flashing light and lantern replaces the alternating red and white catoptric light heretofore shown. The illuminant is petroleum vapour burned under an incandescent mantle. The characteristic of the new light is as follows:—

Flash. . . . .	.56 seconds.
Eclipse.	1.94 “
Flash. . . . .	.56 “
Eclipse.	11.94 “

Complete revolution, 15 seconds. Candle-power, 270,000.

Point Rich, Newfoundland.—The revolving white catoptric light heretofore shown at this point has been superseded by a 3rd order dioptric double flashing light, shewing two flashes every 5 seconds, thus:—

Flash. . . . .	.25 seconds.
Eclipse. . . . .	.75 “
Flash. . . . .	.25 “
Eclipse.	3.75 “

The illuminant is petroleum vapour burned under an incandescent mantle. Candle-power, 100,000.

ONTARIO.

New Lights.

Argenteuil Bay, Ottawa River, Front Light.—120° Chance anchor lantern.

Argenteuil Bay, Ottawa River, Back Light.—120° Chance anchor lantern.

Cobourg Range, Front Light.—360° Chance anchor lantern.

Cobourg Range, Back Light.—360° Chance anchor lantern.

Sheguiandah Range, Front Light.—240° Chance anchor lantern.

Sheguiandah Range, Back Light.—120° Chance anchor lantern.

Three Mile Point.—200 mm. special acetylene lighthouse lantern and acetylene tank.

Walpole Island, Front Light.—Piper lantern with 8" pressed lens.

Walpole Island, Back Light.—Piper lantern with 8" pressed lens.

Improvements.

Bois Blanc.—The catoptric light has been removed and a 4th order 360° French lens with a 35 mm. Diamond vapour light installed.

Coppermine Point.—A permanent tower having been erected, a Canadian 5' 6" lantern with a 5th order French lens with brass and iron stand using duplex lamp replaces the dioptric 7th order light heretofore shown.

Cove Island.—A 55 mm. Diamond vapour installation and adjustable brass stand replaces the duplex lamp.

Christian Island.—A 35 mm. Diamond vapour installation and adjustable brass stand replaces the duplex lamp.

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Chantry Island.—A 55 mm. Diamond vapour installation and adjustable iron stand replaces the duplex lamp.

False Ducks.—A 55 mm. Diamond vapour installation and adjustable iron stand replaces the duplex lamp.

Fort William.—120° Chance lantern.

Goderich, Main Light.—The catoptric light has been removed and a 4th order French lens with a 25 mm. Diamond vapour light installed.

Goderich, Front Light.—A 5th order 270° French lens with duplex lamp replaces the old catoptric light and the colour changed from fixed red to fixed white.

Goderich, Back Light.—A new constant level lamp with a 24" reflector has been installed.

Griffith Island.—A 55 mm. Diamond vapour installation and adjustable brass stand replaces the duplex lamp heretofore used.

Ile Perrot.—The range lights at this point have been changed from fixed white acetylene lights to fixed white oil lights and are shown from anchor lanterns.

Lamb Island.—The catoptric light heretofore shown has been replaced by a 4th order 360° French lens and a 35 mm. Diamond vapour installation with adjustable iron stand.

Meaford.—Owing to the improvements made by the Public Works Department to this harbour, which necessitated changing the aids to navigation, they have been re-arranged as follows:—

1st. A range of fixed incandescent lights on the east side of the harbour, which in one show the best water in approaching, have been erected. The front light is white and the back red.

2nd. A fixed red light is shown from an anchor lens lantern on a post on the outer end of the new extension to the breakwater.

3rd. The hand fog horn will be operated from the west pier, as heretofore.

Mississagi Strait.—A 4th order 240° French lens with a 35 mm. Diamond vapour installation and adjustable iron stand replaces the old catoptric light.

Nottawasaga.—A 55 mm. Diamond vapour installation with adjustable iron stand replaces the duplex lamp.

Oka Wharf.—A 7th order 240° Chance lens and brass stand has been installed.

Owen Sound, Front Light.—A 35 mm. Diamond vapour installation with brass and iron stand replaces the duplex lamp.

Owen Sound, Back Light.—A 35 mm. Diamond vapour installation with brass and iron stand replaces the duplex lamp.

Pelee Island.—The catoptric light heretofore shown has been replaced by a 5th order 360° French lens with adjustable iron stand and duplex lamp.

Pelee Passage.—A 55 mm. Diamond vapour installation replaces the duplex lamp.

Point Clark.—A 55 mm. Diamond vapour installation with an iron stand replaces the duplex lamp heretofore used.

Point Edward, Front Light.—The catoptric light has been replaced by a 5th order 360° French lens with brass stand and duplex lamp.

Point Edward, Back Light.—A new constant level lamp with an 18-inch silvered copper reflector has been supplied.

Port Elgin.—A 360° Chance anchor lantern replaces the catoptric light.

Sailors Encampment, Front Light.—A new constant level lamp with 20-inch silvered copper reflector has been supplied.

Sailors Encampment, Back Light.—A new constant level lamp with 20-inch silvered copper reflector has been supplied.

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Salmon Point.—A 4th order 360° French lens with a 35 mm. Diamond vapour installation and iron stand replaces the old catoptric light.

Scotch Bonnet.—A 4th order 360° French lens with a 35 mm. Diamond vapour installation and adjustable iron stand replaces the old catoptric light.

South Bay Point.—A 4th order 360° French lens with a 35 mm. Diamond vapour installation and adjustable iron stand replaces the old catoptric light.

Stag Island.—A 360° 7th order Chance lens and brass stand, with duplex lamp replaces the light shown from the pressed lens.

Stokes Bay.—A new constant level lamp with 22-inch silvered copper reflector.

Thames River, Main Light.—A 5th order 360° French lens with iron stand and brass supports, also duplex lamp replaces the 7th order light.

Thunder Cape.—A 4th order dioptric single flashing light giving one bright flash every 15 seconds, the illuminant being petroleum vapour burned under an incandescent mantle, supersedes the revolving white catoptric light.

Colchester Reef.—A 55 mm. Diamond vapour installation and adjustable iron stand replaces the duplex lamp.

Gas Buoy Services.

Two new gas buoys have been placed near the eastern cut from Lake Erie to the Detroit river.

Courtwright, St. Clair River.—Gas buoy.

Point Edward, Sarnia.—Gas buoy.

OTHER AIDS TO NAVIGATION.

Flowerpot Island (temporary).—Hand fog horn.

MANITOBA.

New Lights.

Warrens Island Range, Front Light.—A 7th order 180° Chance lens and brass stand with duplex lamp.

Warrens Island Range, Back Light.—7th order 120° Chance lens and brass stand with duplex lamp.

Warrens Landing Range, Front Light.—Constant level lamp with 24-inch silvered copper reflector.

Warrens Landing Range, Back Light.—Constant level lamp with 24-inch silvered copper reflector.

Westbourne.—Three Wigham lamps have been supplied the Manitoba Gypsum Company for use on Lake Manitoba.

BRITISH COLUMBIA.

Improvements.

Cape Mudge.—The fixed white dioptric 7th order light has been replaced by a 5th order dioptric apparatus. The illuminant being petroleum vapour burned under an incandescent mantle.

Discovery Island.—A 4th order 360° Chance lens, Diamond occulting machine and 35 mm. Diamond vapour installation.

Fisgard.—A 35 mm. Diamond vapour installation replaces the duplex lamp.

Pachena Point.—A 1st order dioptric double flashing light and lantern has been erected, replacing the temporary light shown from a lantern on a gas tank. The light is flashing white showing two bright flashes of .44 seconds duration, separated by

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an eclipse of 5.36 seconds duration, the total period being 7.44 seconds, thus: Flash, .44 second; eclipse, 1.2 seconds; flash, .44 second; eclipse, 5.36 seconds. Candle power, 450,000.

Trial Island.—The temporary fixed white light has been replaced by a double flashing light of the 4th order, showing a group of two flashes with a short interval between them every 10 seconds. Candle power, 25,000.

Gas Buoy Service.

The following new gas buoys and beacons have been put in service:—

Casey Point, Prince Rupert Harbour.—Gas buoy.

Dall Patch.—Gas and whistling buoy.

Stenhouse Shoal, Browns Passage, Hecate Strait.—Gas and whistling buoy.

Lookout Island, Halibut Channel.—Gas beacon.

First Narrows, Vancouver Harbour.—Gas beacon.

Holland Rock, Chatham Sound.—The beacon heretofore maintained at Green Top island has been removed and installed at this point.

Other Aids to Navigation.

Inverness, North Skeena Passage.—Conical steel buoy.

Inverness Cannery, two cables west.—Wooden beacon.

Prince Rupert Harbour Fairway.—The red spar buoy has been removed and replaced by a conical steel buoy.

Shark Spit, Mary Island, Strait of Georgia.—A steel conical buoy, painted red has been moored off the end of the spit, replacing a wooden beacon which has disappeared.

INCLOSURE NO. 2.

Statement by provinces showing the number of light stations, lights, fog alarms and warning buoys in service during the fiscal year 1908-9.

	Light stations.	Fog alarm stations.	Lights.	Lightships.	Lightboats.	Keepers.	Diaphones.	Sirens.	Fog horns and trumpets.	Fog bells.	Hand fog horns.	Hand fog bells.	Gas buoys.	Gas beacons.	Whistling buoys.	Bell buoys.	Submarine bells.	Fog whistles.	Fog guns or bombs.
Nova Scotia.....	246	2	274	2	—	248	10	—	3	5	38	—	36	—	15	34	4	7	1
New Brunswick.....	115	4	146	1	1	125	8	—	6	3	19	1	17	—	2	14	1	2	—
Prince Edward Island..	45	—	72	—	—	48	1	—	1	—	—	—	4	—	3	1	—	—	—
Quebec.....	209	1	291	5	1	227	17	1	2	—	12	2	95	—	1	1	4	3	6
Above Montreal and Ontario.....	244	—	316	2	—	212	18	2	3	2	36	1	65	—	—	4	—	2	—
Manitoba.....	7	—	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
British Columbia..	80	2	84	1	—	60	11	—	5	10	3	—	17	27	2	4	—	1	—
	946	9	1,193	11	2	923	65	3	20	20	108	4	234	27	23	58	9	15	7

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Besides the above mentioned lights, there are listed in the 'List of Lights,' by provinces, the following number under private control:—

Nova Scotia.. . . .	1
New Brunswick.. . . .	1
Quebec.. . . .	3
Ontario.. . . .	41
British Columbia.. . . .	4
Total.. . . .	50

INCLOSURE NO. 3.

Statement by divisions showing the number of gas buoys in service throughout the Dominion during the fiscal year 1908-9.

District No.	District.	Type.						Total.
		5 & 6	7 & 8½	9 & 9½	11	14	*C	
1	Nova Scotia.. . . .		7	3	15	2		27
2	New Brunswick**.. . . .	2	11	3	9			25
3	Prince Edward Island***.. . . .	1		4				5
4	Quebec.. . . .		21				9	30
5	Platon-Montreal.. . . .		14				51	65
6	Montreal-Kingston.. . . .	7	33					40
7	Lake Ontario.. . . .	1	1					2
8	Lake Erie.. . . .		4					4
11	Thames River.. . . .		1					1
12	St. Clair River.. . . .		1					1
13	Sarnia.. . . .		1					1
14	Goderich.. . . .		1					1
15	Southampton.. . . .		1					1
16	Georgian Bay.. . . .		5		3			8
17	Sturgeon River.. . . .	1						1
18	Sault Ste. Marie.. . . .	2						2
19	Port Arthur.. . . .		3					3
24	British Columbia.. . . .		7	9	1			17
		14	111	19	23	2	60	234

*Compression.

**Nine buoys on the Nova Scotia coast have been included here, as they are attended to by the New Brunswick Agency.

***One buoy on the New Brunswick coast has been included here, as it is attended to by the Prince Edward Island Agency.

INCLOSURE NO. 4.

Statement giving complete list of stations at which gas buoys were in operation throughout the Dominion during the fiscal year 1908-9.

UNDER THE NOVA SCOTIA AGENCY.—DISTRICT No. 1.

Station No.	Name of Station.	Description of Buoy.
24	Pubnico.....	Gas and whistling.
27	Cape Sable, South-west Ledge.....	" "
29	Brazil Rock.....	" "
32	Shelburne.....	" "
35	Lockeport.....	" "
37	Little Hope.....	" "
39	Liverpool.....	" "
40	Liverpool Fairway.....	" and bell.
45	La Have.....	" "
48	Lunenburg.....	" and whistling.
49	Lunenburg, East point Ledges..	" and bell.
54	North-east Shoal.....	" and whistling.
60	Sambro.....	" "
61	Outer Automatic, Halifax Harbour.....	" "
62	Inner Automatic, Halifax Harbour.....	" "
63	Neverfail, Halifax Harbour.....	Gas.
65	Thrumcap.....	" and bell.
67	Middle Ground, Halifax Harbour.....	Gas.
70	Egg Island.....	Gas and whistling.
72	Sheet Harbour.....	" "
76	Liscomb.....	" "
80	Isaac Harbour.....	" "
84	Whitehead.....	" "
86	Canso or Grime Shoal.....	" "
90	Cerberus Rock.....	" "
100	Guion Island.....	" "
102	Louisburg.....	" "
108	Sidney Fairway or Low Point.....	" "
109	South-east Bar, Sidney.....	Gas.

UNDER THE NEW BRUNSWICK AGENCY.—DISTRICT No. 2.

4-S.	Blonde Rock.....	Gas and whistling.
6-S.	South-west Fairway, Yarmouth.....	" "
8-S.	Cape Fourchu.....	" "
10-S.	Hen and Chickens, Yarmouth.....	" and bell.
12-S.	South-west Ledge, Brier Island...	" and whistling.
14-S.	North-west Ledge, Brier Island.....	" "
16-S.	Avon River.....	Gas.
3	Old Proprietor.....	Gas and whistling.
5	North Wolves.....	" "
7	Point Lepreau.....	" "
9	Partridge Island.....	" "
18	Foul Ground, St. John Harbour.....	Gas.
20	Quaco Ledge.....	Gas and whistling.
31	Scaumenac, Restigouche River.....	Gas.
32	Point Lanin, Restigouche River.....	Gas.
34	Point LaGarde, Restigouche River.....	Gas.
36	Oak Point, Restigouche River.....	Gas.
38	Traverse, Restigouche River.....	Gas.
40	Busteed, Restigouche River.....	Gas.
42	Horseshoe Bar East, Miramichi River.....	Gas.
44	Horseshoe Bar West, Miramichi River.....	Gas.
46	Young's Point, Caraquet.....	Gas.
47	Grassy Point, Caraquet.....	Gas.

UNDER THE PRINCE EDWARD ISLAND AGENCY.—DISTRICT No. 3.

1	Indian Rocks.....	Gas and whistling.
2	Point Prim.....	" "
3	Fitzroy Rock.....	" "
5	Miscouche Shoal.....	" "
6	Zephyr Rock, Shediac Bay, N.B.....	Gas.

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UNDER THE QUEBEC AGENCY.

District No. 4.

Station No.	Name of Station.	Description of Buoy.
27-B.	Father Point.....	Pintsch gas.
29-B.	Rimouski Road.....	"
38-B.	Barrett's Ledge.....	" gas and bell.
51-B.	Pilgrim Shoal.....	Gas and bell.
56-B.	Traverse, Middle Ground.....	Gas.
58-B.	Middle Ground Centre, Opposite Lower Traverse Pier.....	"
60-B.	Middle Ground, Traverse, South-west extremity.....	"
64-B.	Channel Patch.....	Pintsch, gas and bell.
65-B.	St. Jean Port Joli.....	Gas.
67-B.	Beaujeu Bank, North-east extremity.....	" and bell.
69-B.	Beaujeu, New Channel, left hand.....	Gas.
70-B.	Beaujeu Bank, South-west of stream.....	" and bell.
77-B.	St. Thomas.....	Gas.
80-B.	Quarantine or Grosse Isle.....	"
86-B.	Madame Island Reef.....	"
87-B.	Beaumont Reef.....	"
89-B.	Point Levis.....	"
96-B.	Lark Reef, South end.....	Pintsch gas.
102-B.	Morin Shoal.....	Gas.
106-B.	Grande Pointe.....	Pintsch gas.
110-B.	Eastern Narrows, North Traverse.....	"
10-Q.	Fly Bank.....	Gas.
15-Q.	St. Augustin Bar.....	"
24-Q.	Pointe aux-Trembles.....	"
28-Q.	Point St. Antoine.....	"
34-Q.	Ste. Croix.....	"
49-Q.	Point Platon.....	"
Temporary.	St. Thomas Bank.....	Pintsch gas.
"	".....	"
"	Lower Traverse.....	Gas.

MONTREAL DIVISION.

District No. 5.

2-C.	Point Citrouille.....	Gas.
15-C.	Champlain or Poullier Carpentier.....	"
20-C.	Ile Bigot.....	"
23-C.	Becancour, Lower Traverse.....	"
30-C.	Becancour Bend.....	"
39-C.	Becancour, Upper Traverse.....	"
43-C.	Cap Madeleine.....	"
55-C.	Ile aux Cochons.....	"
59-C.	Three Rivers Shoal.....	"
6-L.	Poullier Laforce.....	"
13-L.	English Bay.....	"
17-L.	Curve No. 3.....	"
21-L.	".....	"
25-L.	".....	"
35-L.	Pointe du Lac course.....	"
41-L.	".....	"
47-L.	".....	"
57-L.	Yamachiche Bend.....	"
48-L.	".....	"
67-L.	Curve No. 2 to White Buoy.....	"
79-L.	".....	"
85-L.	".....	"
91-L.	Curve No. 1 to Curve No. 2.....	"
97-L.	".....	"
103-L.	".....	"
111-L.	Ile aux Raisins.....	"
123-L.	Pointe aux Soldats.....	"
136-L.	Ile de Grace.....	"
146-L.	Nepigon Shoal.....	"
1-M.	Hay Island or Ile aux Foins.....	"
5-M.	St. Ours Traverse.....	"
16-M.	Bellmouth Curve.....	"
20-M.	".....	"
24-M.	".....	"

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MONTREAL DIVISION—*Con.**District No. 5—Con.*

Station No.	Name of Station.	Description of Buoy.
31-M.	Contrecoeur Bend.....	Gas.
45-M.	Contrecoeur Junction.....	"
82-M.	Plum Island.....	"
89-M.	Verchères.....	"
103-M.	Pouillier des Trois Bouées.....	"
117-M.	Cap St. Michel.....	"
124-M.	Ile des Lauriers.....	"
129-M.	Varenes Curve.....	"
133-M.	Varenes Curve.....	"
149-M.	Pointe aux Trembles Bend.....	"
167-M.	Pointe aux Trembles Curve.....	"
174-M.	Longue Pointe.....	"
177-M.	Pouillier à Gagnon.....	"
181-M.	Longueuil.....	"
191-M.	Longueuil.....	"
193-M.	Longueuil.....	"
194-M.	Maisonneuve.....	"
195-M.	Ile Ronde.....	"
196-M.	Longueuil.....	"
52-Q.	Portneuf.....	"
68-Q.	Batture Simon.....	"
73-Q.	Batture du Chêne.....	"
77-Q.	Batture à Cadieux.....	"
80-Q.	Cap Charles.....	"
90-Q.	Cap à la Roche Curve.....	"
97-Q.	Upper Cap à la Roche.....	"
105-Q.	Cap Levrard.....	"
110-Q.	Cap Levrard.....	"
115-Q.	Batiscan Traverse.....	"
119-Q.	Batture St. Pierre.....	"
123-Q.	Batiscan Anchorage.....	"
129-Q.	Batture Perron.....	"

UNDER THE PRESCOTT AGENCY.

District No. 6.

25-F.	Grosse Point.....	Gas.
30-F.	Soulanges Canal, entrance.....	"
36-F.	Coteau Landing.....	"
40-F.	Hay Point.....	"
43-F.	West end of Middle Ground.....	"
46-F.	Port Lewis.....	"
48-F.	Point Mouillé Flats.....	"
64-F.	Lancaster.....	"
68-F.	Island Bank.....	"
69-F.	East Lancaster Bar.....	"
76-F.	Lancaster Bar.....	"
73-F.	Squaw Island.....	"
84-F.	Clark's Island.....	"
88-F.	Colquhoun Island.....	"
96-F.	St. Regis Dyke, West end.....	"
16-S.	Four-fifth mile above Lachine.....	"
18-S.	Foot of dredged cut above Lachine.....	"
38-S.	Lachine Cut, upper entrance.....	"
48-S.	East of Lightship No. 2.....	"
53-S.	Off Brown's Point.....	"
76-S.	Between Light No. 2 and Light No. 3.....	"
86-S.	Between top light and Ile Perrot.....	"
98-S.	Windmill Point.....	"
100-S.	Entrance to Soulanges Canal, East.....	"
102-S.	Entrance to Soulanges Canal, East.....	"
104-S.	Soulanges Canal, East.....	"
2-T.	Brockville Narrows.....	"
4-T.	Hillcrest.....	"
6-T.	Cole Shoal, Middle Ground.....	"
8-T.	Fiddlers Elbow.....	"
12-T.	Gananoque Narrows.....	"
38-T.	Wolf Island.....	"
46-T.	Cold Bath Shoal.....	"

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UNDER THE PRESCOTT AGENCY—*Concluded.*

Station No.	Name of Station.	Description of Buoy.
69-T.	West end of Middle Ground, between Snake Island and Seven Acre Shoal	"
102-T.	Northport Shoal	"
106	Trenton	"
6-U.	Delaney's Shoal	"
8-U.	Archibald Shoal	"
40-U.	Farran Point	"
54-U.	Prunner Shoal	"
127-U.	Dixon Island	"
136-U.	Upper entrance, Iroquois Canal	"

ONTARIO DIVISION.

Lake Erie, District No. 8.

1	Bar Point	Gas.
2	Grub Reef	"
5	Eastern Cut, Lake Erie	"
6	Eastern Cut, Lake Erie	"

Thames River, District No. 11.

1	Thames River	Gas.
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St. Clair River, District No. 12.

1	Courtwright	Gas.
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Sarnia, District No. 13.

1	Point Edward	Gas.
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Goderich, District No. 14.

2	Goderich Fairway	Gas.
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Southampton, District No. 15.

4	Chantry Island, North	Gas.
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Georgian Bay, District No. 16.

1-P	Spruce Shoal	Gas.
2-P	Hooper Island	"
3-P	Middle Ground	"
4-P	Three Star Shoal	"
5-P	Seguin Bank	Gas and whistling.
6-P	Lone Rock	" "
7-P	Lockerbie Rock	Gas.
8-P	Surprise Shoal	Gas and whistling.

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ONTARIO DIVISION—*Concluded.**Sturgeon River, District No. 17.*

Station No.	Name of Station.	Description of Buoy.
1-N	Sturgeon Bar	Gas.

Sault Ste. Marie, District No. 18.

1	Vidal Shoal	Gas.
2	Upper Turning Buoy.....	"

Port Arthur, District No. 19.

1	Port Arthur.....	Gas.
2	Southeast Dredged Channel, Port William	"
3	Northeast Dredged Channel, Port William.....	"

BRITISH COLUMBIA DIVISION.

District No. 24.

1	Lookout Island	Gas beacon.
2	Kyuquot	Gas and whistling.
17	Swiftsure Bank	Gas, whistling and bell.
19	San Juan	Gas and whistling.
23	Lewis Reef	Gas beacon.
24	Kelp Reef	"
25	Dock Island	"
27	Helen Point	Gas and explosive fog bell beacon.
29	Walker Rock	Gas beacon.
30	Coffin Islet	"
31	Danger Reef	"
32	Joan Point	Gas beacon.
33	Gabrola Reef	"
35	Sand Head	Gas, whistle and bell.
37	First Narrows, Vancouver Harbour	Gas beacon.
40	Sechelt	"
42	Gallows, Point, Nanaimo Harbour	"
43	West Rocks	"
45	Kelp Bar	Gas and bell.
49	Lund	Gas beacon.
52	Gillard Island	"
53	Maud Island	"
54	Chatham Point	Gas and explosive fog bell beacon.
58	Haddington Reef	Gas.
64	Zero Rock	Gas beacon.
67	Fog Rocks	"
70	Dall Patch	Gas and whistle.
72	Vancouver Rock	"
74	Boat Bluff	Gas beacon.
84	Klewnuggit	"
86	Watson Rock	"
89	Holland Rock	"
92	Casey Point	Gas.
93	Kestrel Rock	"
94	Spire Ledge	"
95	Barrett Rock	"
96	Coast Island	Gas beacon.
97	Ridley Island	"
101	Alford Rock	Gas.
103	Hodgson Reef	Gas and whistling.
105	Pointers	Gas beacon.
107	Stenhouse Shoal	Gas and whistling.
110	Skidegate or Lawn Point	Gas and bell.
112	New England Rock	Gas and whistling.

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INCLOSURE NO. 5.

*Outline chart Atlantic coast of Canada showing quick flashing lights of the hyper-radial, 1st order, 2nd order, 3rd order, 3rd order small model and 4th order in operation during the fiscal year 1908-9.

The whole respectfully submitted.

J. G. MACPHAIL,
Acting Commissioner of Lights.

Commissioner of Lights Office,
Marine and Fisheries, Canada.
March 31, 1909.

* NOTE.—The outline chart will be found with the illustrations at the end of the Report.

APPENDIX No. 3.

RIVER ST. LAWRENCE SHIP CHANNEL.

SIR,—I have the honour to present the following annual report on the operations for the improvement of the River St. Lawrence Ship Channel during the fiscal year ending March 31, 1909.

While every effort has been made to urge forward the work, it is necessary to take very great care to so arrange the operations that navigation is not interrupted, nor dredge vessels put in more than the usual danger.

The success of the operations is due in a very large measure to the skill and energy of the staff in charge, and also to the untiring and careful work of the various captains, engineers, and crews of the different vessels.

I have the honour to be, sir,
Yours obediently,

V. W. FORNERET, B.A.Sc.
Superintending Engineer.

G. J. DESBARATS, Esq.,
Acting Deputy Minister, Marine and Fisheries,
Ottawa.

HISTORY OF THE SHIP CHANNEL.

The St. Lawrence, owing to its situation, is the natural route from the Atlantic to the northern and northwestern half of the North American continent.

The opening of the Lachine canal, connecting Montreal with the great lakes in 1825, established the route commercially.

The light draught sailing vessels could then reach Montreal without trouble, except during a few weeks in the autumn when they resorted to lightering.

In 1844, it was in an effort to give navigation up to Montreal for vessels of 500 tons, that the first work of dredging was undertaken.

The first proposals for improvements were discussed in 1825, the national character of the work being then recognized. Surveys were made and reported upon in 1831, and again in 1838.

In 1841, during an investigation, the committee proposed a tonnage duty sufficient to provide for the cost of the improved channel, which it was considered would be less than that of lighterage. It was, however, agreed that 'in order to draw the produce of the west down the St. Lawrence, it was expedient to make the transit charges as light as possible.'

Operations were commenced by the 'Board of Works' in 1844 and continued until 1847, when owing to opposition as to the location of the channel the work was abandoned. This work was in Lake St. Peter, in what was known as the Straight channel. After sixty years, it is now considered that the straight channel as commenced, would have been preferable in many ways.

In 1850, the Harbour Commissioners of Montreal proposed that they could do the work more economically and expeditiously. They asked for authority to under-

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take the work and to charge a tonnage duty to pay for the 8 per cent interest and 2 per cent sinking fund.

This plan was adopted in August, 1850, and the commissioners were authorized to proceed in such a manner as they should deem best, the government plant being transferred to them.

The Harbour Commissioners, after examination and the best advice obtainable, adopted the location of the deepest natural channel in Lake St. Peter. This results in the present channel with five tangents, instead of two long straight courses as at first commenced.

The original depth through Lake St. Peter, was 10 feet 6 inches.

From 1850, the channel was deepened from stage to stage until in 1888, when the debt amounted to somewhat over three million dollars, the government decided to complete the channel as a national work, and to assume the debt, and from that day the channel has been open free to the commerce of the world.

At that date the channel had been deepened to 27½ feet at ordinary low water from Montreal to Cap à la Roche, and from there to Quebec the tide was available.

Nearly 20,000,000 cubic yards had been dredged at an average cost of about 20 cents per yard, including the cost of the plant.

A dredge of the type of 1846, excavated in Lake St. Peter in one day 1,200 cubic yards. By wonderful improvements, in 1888, the dredge of that time could make 7,200 yards without trouble. At the present time, working day and night, the Lake St. Peter dredge removes at a fairly average rate 20,000 cubic yards per day.

This work was conducted by the Department of Public Works of Canada from 1889 until 1904, when the management and control of the river together with the shops and dredges, were handed over to the Department of Marine and Fisheries, which department had general charge of navigation.

At the present time a splendid channel of 30 feet at extreme low water exists from Montreal to Cap à la Roche, and to Quebec, by taking advantage of the tide.

The success of the work is in a great measure due to the geographical situation of the route, the physical features of the river favourable for improvement, the determination and public spirit of the business men and industrial corporations of Montreal, and to the recognition by the government of Canada of the national character of the project.

PROGRESS OF THE OPERATIONS.

From 1850 to 1888 the work was conducted by the Harbour Commissioners of Montreal.

The first dredging plant was designed and engined on the Clyde in 1840.

It is interesting to note that in 1906 the designs for the latest dredge for the Clyde, were made by Mr. John Kennedy, C.E., then Chief Engineer of the Montreal Harbour Commissioners.

The St. Lawrence dredging operations have always been conducted departmentally. The extent and continuity of the work have resulted in a staff, and an organization of men and plant, which is one of the subjects of interest in the commercial and engineering circles of the world. The engineers who have been connected with the St. Lawrence ship channel comprise the best known men in the profession in Canada.

The names of Bayfield, Gzowski, Keefer, Forsyth, Nish and Kennedy, who were the chief engineers at various times between 1840 and 1888, will go a long way to explain the success of the efforts for obtaining the improvements as planned by the government and the commissioners.

The Superintendents Vaughan, Bell, Armstrong, McKenzie and Howden have from time to time improved methods and plant, until the operations on the St. Lawrence are considered examples for other and older ports.

The rule has been to thoroughly understand the conditions and requirements and then to design dredging machines for the special work they are expected to perform.

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The St. Lawrence dredging plant comprises a wide range of types:—

- Two elevator dredges for soft clay,
- Four elevator dredges for hard-pan and shale rock,
- One hydraulic dredge for soft mud, discharged by pipe.
- One sand pump hopper sea-going dredge,
- One hydraulic hopper sea-going dredge.

In every case these machines are actually doing their work as well or better than it could be dredged by any other existing type in the world.

With the staff for designing the channel and a plant specially suitable for the work proposed, the next consideration is the organization for keeping the machines constantly at work.

The St. Lawrence dredges work for seven months each season. They have then five months in winter quarters. The object of the working staff is to keep the dredge going as constantly as possible during the seven-month's season. Owing to the very hard character of the material, and the necessity of not interrupting traffic, breakages and stoppages are frequent. The endeavour is, however, to keep as near to 70 per cent of the full working time as possible.

The working hours with double crews, are 132 hours per week, *i.e.*, from midnight on Sunday, without stops for meals, until noon on Saturday. The men were glad to work during twelve hours on condition of their receiving about 10 per cent increase of wages.

The crews of the dredges, tugs, barges, &c., are almost exclusively French Canadians, born and brought up on the banks of the St. Lawrence. For skill, patience, sobriety and fitness for the work, it would be quite impossible to find their equal. Most of them make it their life work. They are trained to every phase of operating a dredge to the limit of its strength, to being resourceful and to quickly making repairs.

By order from the minister conducting the department, owing to the faithful discharge of continuous duties, the men are taken to Sorel every second Sunday.

The repair and construction shipyard and shops at Sorel also add very materially to the success. The rule is to drive the machinery to its limit, to expect breakdowns, and to have spares or the equipment for speedy repairs.

The strain on the men, and machinery is very great. At the end of seven months a rest is inevitable.

The whole work being in the interest of navigation, the channel is periodically examined and swept, to be sure that there are no obstructions. The depth of water is given daily. In the first part of the season, the depth of the 30-foot channel ranges from 36 to 42 feet. It lowers in September, and usually the lowest stage is reached in October. The highest in 1908 was 42 feet 4 inches, and the lowest 30 feet.

In the long experience of design and usage, the machinery has been brought to a state of perfection and strength, the shale-rock merging into soft limestone is dredged, at a speed and cheapness most extraordinary.

As a government organization the ship channel is well known as being able to compete in every way with operations by contract. This is due to the fact that an efficient staff, good men, and the best plant are provided.

The aims which have resulted in marked success are briefly as follow:—

- (1) To keep the plant up to the best standard of design and suitability for the work.
- (2) To provide first-class officers and crews.
- (3) To design the improvements with careful consideration.
- (4) To keep down costs by a thorough system of comparative statistics.
- (5) To keep up the quality by a regular and systematic inspection.
- (6) As a public work to keep the confidence of the public by consultation with those who are interested and make use of the improvements.

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THE PRESENT PROJECT.

The present project for a 30-foot channel between Montreal and Quebec was adopted in 1889, while the improvements below Quebec were decided upon in 1906.

The estimate of 1899 was for ten years' work. The plant was only partially available until 1903.

The project for the channel between Montreal and Quebec had in view a channel of 30 feet depth, at the extreme low water of 1897, from Montreal to tide water at Batiscan, and from Batiscan to Quebec at extreme low tide. The width contemplated was a minimum of 450 feet in the straight portions, and from 550 to 750 feet at the bends. An anchorage was to be provided for Lake St. Peter.

Of this work, the 30-foot channel from Montreal to tide water at Batiscan, was completed in 1906. This is now in use, deep draught vessels in the autumn waiting for tide, to pass cap à la Roche and St. Augustin bar.

The work remaining to be done is about two miles of shale rock at Cap à la Roche; about one mile at Grondines, about one mile at St. Augustin bar, and also about one mile of widening at Ste. Croix, and $5\frac{1}{4}$ miles of widening in Lake St. Peter.

Cap à la Roche will probably take from three to four years to complete, while the remainder to Quebec should be completed at the same time or in one year longer.

The widening of Lake St. Peter it is expected will be done in 1909.

The project of work below Quebec, had in view a 30-foot channel at low tide at St. Thomas flats, and at Beaujeu banks everywhere 1,000 feet wide.

The Beaujeu bank will be completed in 1909.

The St. Thomas flats, where the material is clay and sand, and covering nearly four miles of channel should be finished in about three years.

THE PLANS FOR THE FUTURE.

The completion of the 30-foot project being in sight, it is not too soon to look forward to the next step.

The 30-foot channel was designed and laid out so as to be easy of navigation for the largest ships that could pass with the available depth. The widths and curves were designed for a much greater available depth than 30 feet.

A new depth may therefore be commenced without changing the lines of the channel, or the aids to navigation.

With the ship channel dredges a face of 4 feet is preferable as being a full economical cut. As, however, 35 feet would give easy navigation to the largest present New York steamships, it has been considered the best proposal for the next project.

The plant available at present for between Montreal and Quebec, consists of six elevator dredges, one hydraulic dredge, two stone lifters, and a complement of tugs, scows, &c.

For below Quebec there are two splendid seagoing hopper dredges.

For the upper reach one large size spoon dredge is under construction. A steel hull elevator dredge, capable of dredging to a greater depth is authorized, as well as a new stone-lifter.

At least two of the present elevator dredges having wooden hulls will not last many more years, and the construction should be commenced of one each year. They take about two years to build.

Two or three additional tugs and several scows will also be required.

The plant for below Quebec is in every way suitable for the work, except that a larger tug should be connected with it.

The present progress is excellent, the plant is unique in fitness and economy, and the extent and importance of the operations would be considered remarkable anywhere in the world.

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ACCIDENTS IN THE ST. LAWRENCE RIVER BETWEEN MONTREAL AND FATHER POINT.

Not one accident of importance took place in the ship channel proper during the season of 1908, and those which did occur were of minor character. This speaks well for those in charge of the vessels, the season being an exceptional one for heavy fogs and thick smoke, which completely paralyzed navigation for days at a time.

The only accidents in the St. Lawrence river, between Montreal and Quebec, were as follows:—

SS. *Marina*, Donaldson line, went aground at Varennes on September 18, in thick fog. Was refloated. No damage.

SS. *Fimerite*, went ashore at Longue Pointe, on October 15, during fog. Was refloated. No apparent damage.

C.G.S. *Montcalm* and C.P.R. steamer *Milwaukee*, collision in Quebec harbour. The C.G.S. *Montcalm* sank in Custom House basin, where she had gone for refuge. *Milwaukee* had her bow badly damaged.

SS. *Inishowen Head*, Head line, went ashore, Union cove, Quebec, October 1. Refloated. No damage.

BETWEEN QUEBEC AND FATHER POINT.

SS. *Amethyst* went ashore at Green island, near Saguenay river, on June 30. Refloated. No damage.

SS. *Catalone*, British steamer, grounded at Red island on August 12. Refloated. No damage.

SS. *Gustav Adolph*, Swedish steamer, went ashore at Goose island on September 5. Refloated, repaired.

SS. *Corinthian* (Allan line), and SS. *Malin Head* (Head line). Collision near Grosse Isle on September 13. Both vessels badly damaged. *Malin Head* beached at St. Laurent to prevent sinking. Collision due to haze, caused by smoke from forest fires.

SS. *Ashanti*, British steamer, went ashore at Madame reef, opposite Island of Orleans, on October 26, during fog. Refloated, repaired.

MARINE SIGNAL SERVICE.

The commencement of night navigation, and the increase in size of ships, as well as general improvement on all sides, called for a system of signal service.

It was frequently found that by prompt action serious results from accidents could have been avoided, and sometimes signals of danger could have prevented bad accidents.

The government of Canada, therefore, through the Minister of Marine and Fisheries, took up the matter and established in connection with the River St. Lawrence Ship Channel a telephone service extending from Montreal to Crane island below Quebec.

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There are twelve stations, established at the following places:—

	Distance in nautical miles from Montreal.	In operation.
Montreal.	0	Day and night.
Longue Pointe.	5	"
Verchères.	19	During daylight.
Sorel.	39	Day and night.
Three Rivers.	71	"
Batiscan.	87	During daylight.
St. Jean des Chaillons.	93	Day and night.
Portneuf.	108	During daylight.
St. Nicholas.	127	Day and night.
Cap Rouge.	132	During daylight.
Québec.	139	Day and night.
Crane island.	171	"

The above stations are connected by a private through telephone system, terminating at Quebec and Montreal.

Crane island station communicates with Quebec via the Bell Telephone Company's system.

The telephone service was started September 1, 1907, but the system of signals was officially inaugurated by the Honourable the Minister of Marine and Fisheries on November 5, 1908.

The value of the combined system of telephone and signals, is such, that expressions of satisfaction are received every day during the season of navigation, when orders may be given, information as to whereabouts of vessels obtained, and signals to passing boats recorded.

The service has also been very useful in connection with the dredging operations, as communications can be made immediately with the officials at the shops at Sorel, where orders can be given for repairs, and owing to the promptness of the service a great deal of valuable time has been saved.

NEW STEEL SPOON DREDGE.

The new steel spoon dredge now nearing completion at the Sorel shipyard, will be the most powerful dredge of this type afloat. She was designed by Mr. John Kennedy, Consulting Engineer of the Montreal Harbour Commissioners.

This dredge is intended for work at Cap à la Roche. It will tear out the bank quickly, and afterwards an elevator dredge will go over the ground to clean up, and make a smooth bottom.

The completion of this dredge has been greatly delayed owing to necessary alterations in the design.

The following are her dimensions:—

	Feet.	Inches.
Length moulded.	108	0
Breadth moulded.	42	0
Depth at bow.	11	6
Depth at stern.	9	9
Length of boom (centre to centre).	55	3
Length of spuds.	74	0
Main engines, 2 compound.	16 and 30 x 22.	
Swinging engines, simples.	10 x 14	
Capstan engines, simples.	10 x 14	
Bucket capacity { 1 14-cub.yd., for soft material.	"	
} 1 8-cub.yd., for hard		

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The pull on the bucket rope will equal 180,000 lbs. The dredge will be able to work to 50 feet, and will be equipped with electric light.

One marine boiler 12 feet in diameter by 10 feet long will furnish steam for the machinery. The boiler will have a working pressure of 160 lbs. per square inch.

NEW ELEVATOR DREDGE.

In order to expedite the work at Cap à la Roche, the department has decided to build a new elevator dredge for working in rock. This dredge is to be modeled after the *Baldwin* (No. 6) but will be able to dredge to 52 feet, and the hull is to be built of steel.

An appropriation for this vessel has been placed in the estimates for 1909-10. The following are her dimensions:—

	Feet.
Length between perpendiculars.	180
Breadth of beam (moulded).	40
Depth of hold.	14
Draught (loaded).	9

C.G. ICE-BREAKER 'MONTCALM.'

Operations 1908-9.

The opening of St. Lawrence navigation last spring, ten days earlier than the previous year was very much hastened by the operations of the steamer *Montcalm* at the Cap Rouge ice-bridge, and also by the successful operating of the steamer *Lady Grey* in breaking up ice-jams at the head of Lake St. Peter amongst the islands.

Under the command of Captain Gagnon, the *Montcalm* began attacking the Cap Rouge ice-bridge on January 12, 1909. The bridge was found to be exceptionally strong, and composed of from 35 to 40 feet in depth, of heavy packed ice, for about three miles, extending from abreast of the Chaudière river up to a short distance above Pointe à Bazile low light. Above this, there was an open area of water about six miles long, and from 1,000 to 2,500 feet in width, containing more or less floating ice which moved up and down with the wind and tide.

After strenuous work during the whole winter, the ice-breaker succeeded in cutting a wide channel through the ice and attained the open water by March 30. She then worked for a few days enlarging this cut, to allow a free passage for ice coming down, to increase the discharge, and thereby help to lower the river level in the upper reaches. This effect on the water level is generally conceded, by information obtained at different points.

Captain Gagnon and his officers deserve a great deal of credit for the capable manner in which they conducted this work, this being the first year on record that an attempt to break up the Cap Rouge ice-bridge has proved a complete success.

After the Cap Rouge ice-bridge was completely destroyed, the *Montcalm* worked her way with fair progress up the river, breaking ice averaging a thickness of 20 inches, as far as Portneuf, where she arrived on April 10.

At Portneuf a ship channel officer was sent on board with one of our best pilots to conduct the operations in the upper part of the river. Here heavy packed ice from 3 to 4 feet in thickness somewhat checked the steamer's advance, but she finally succeeded in forcing her way through to clear water on April 13. On this day it was reported that the ice up as far as Port St. Francis was on the move, so that it was considered advisable to return to Quebec to be on hand in case of a jam occurring at Cap Rouge narrows.

By the 15th, there being no more danger of a jam at Cap Rouge, most of the ice having passed down, the *Montcalm* started up for Port St. Francis to break up any jams which might form when the lake ice started down.

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She reached as far as St. Jean at 11.20 a.m., and was obliged to tie up on account of a very heavy snow storm.

Next day, the 16th, she proceeded up, meeting very little ice, as far as Nicolet Traverse, at the foot of Lake St. Peter.

On her arrival at Nicolet Traverse the *Montcalm* immediately commenced operations, and soon succeeded in starting the lake ice to move down. This jammed at Port St. Francis the following morning, but was easily broken up again, and the ice commenced to move and continued down steadily all that day and during the next night.

On Sunday, April 18, the *Lady Grey* was met at Port St. Francis after she had successfully broken up several jams amongst the islands at the head of Lake St. Peter. This steamer reported the lake practically clear.

There being no more ice in sight, instructions were given for the *Montcalm* to return to Quebec, and the *Lady Grey* to proceed to Montreal, the former arriving at Quebec on the same day and the latter reaching Montreal at 1.30 p.m. after running in clear water the whole way up.

From April 19 to the 21st, while in Montreal, the *Lady Grey* rendered great help in clearing out the ice around the upper piers in the Montreal harbour. She then returned to Sorel.

The results obtained by the operations of the steamers *Montcalm* and *Lady Grey* have not only pleased shipping interests by hastening the opening of navigation, but have also given much satisfaction to riparian residents on both banks of the St. Lawrence between Montreal and Quebec, as it is generally claimed that the work performed by the ice-breakers has prevented floods and thus saved much suffering and damage to property.

GENERAL INFORMATION.

At the end of the season of 1908 there was a completed channel to a depth of 30 feet at extreme low water, from Montreal to Cap Levrard, 4 miles below Batiscan, a distance of 104½ miles below Montreal. Below Cap Levrard advantage is taken of the tide during the low water season to obtain this depth to pass Cap à la Roche and St. Augustin bar.

The available depth in the Cap à la Roche dredged channel is indicated by the St. Jean des Chaillons semaphore, which was put in operation for the season on June 17, 1908.

The available depth over the undredged St. Augustin bar is indicated by the semaphore at St. Nicholas, which was started for the season on June 24, 1908.

With the exception of some minor shoals at Champlain, there is practically no filling in, in the ship channel, and, although, since its commencement no actual boulders have been known to have been carried into the dredged channel, such conditions are possible, and it has been decided, therefore, that once a year the dredged and shallow channels shall be swept.

Mr. N. B. McLean, C.E., with an assistant, are specially detailed for this important work. A twin-screw steamer and a testing scow make up the present sweeping plant.

The additional dredging which has been done below Quebec has increased the amount of sweeping to such an extent that one testing scow is not adequate, and a second outfit will soon have to be procured.

During the course of the sweeping in 1908 no obstruction of any serious nature was found. Two or three vessels were reported to have touched, but the most careful examination failed to reveal anything in the channel.

The work of deepening the St. Thomas channel below Quebec was commenced late in the autumn of 1907, and by the close of the season of 1908, good progress had been made.

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The Beaujeu channel below Quebec, was commenced in 1906. On June 29, 1908, a channel 600 feet wide, and to 30 feet in depth at extreme low tide, was officially opened. It is expected that the full width of 1,000 feet will be completed during the season of 1909.

The exceedingly dry spell of weather during the latter part of the summer of 1908 had the effect of lowering the level of the water in the St. Lawrence to the datum adopted for low water, viz., the low water of the year 1897, which was the lowest on record, except for the extraordinary low water of 1895, which for a few days reached a stage 6 inches lower.

The annual trip of inspection of the ship channel and the works connected therewith, was made by the Honourable the Minister of Marine and Fisheries on November 5, 1908.

The steamer *Lady Grey* left Victoria pier, Montreal, at 8.30 a.m., and the inspection occupied two days and a half, covering various works between Montreal, and Crane island, below Quebec.

The minister, the Honourable Mr. Brodeur, was accompanied by his officials, representatives of the Shipping Federation, Montreal Board of Trade, La Chambre de Commerce, the mayor of Quebec, representatives of the Montreal and Quebec Harbour Commissioners, and the Montreal and Quebec pilots.

Much satisfaction was expressed, at the progress made, especially in dredging, at the various points, and also at the good organization of the Marine Signal Service which was established in 1907. This service was especially useful during the latter part of the season of 1908 when so much smoke and fog prevailed.

Another feature of the trip was the inauguration of a new code of signals, to be used between signal stations and passing steamers, by means of flags by day and lights by night.

The total cost from 1851 to the end of the fiscal year of the ship channel, including plant, shops, survey, &c., is as follows:—

Dredging.. . . .	\$7,208,543 50
Plant, shops, surveys, &c.. . . .	3,501,449 96
	<hr/>
	\$10,709,993 46
	<hr/>

The total number of cubic yards dredged, the material varying from very hard shale rock, to soft blue clay, amounted to 61,767,292.

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Year.	AVERAGE DEPTH FOR EACH MONTH IN THE 27½ FOOT CHANNEL. (27½ feet in Ordinary Low Water.)							FROM SOREL GAUGE DURING EACH YEAR MAY TO NOVEMBER.	
	May.	June.	July.	August.	Sept.	Oct.	Nov.	Highest.	Lowest.
	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
1890.....	35 6	35 3	31 9	30 6	30 9	29 9	30 6	37 0	29 0
1891.....	34 6	31 3	29 9	29 9	30 0	28 3	28 3	36 9	27 3
1892.....	31 0	31 9	31 6	30 6	28 9	28 3	28 3	33 6	27 3
1893.....	36 0	34 3	30 9	29 9	29 6	28 6	28 0	37 6	27 6
1894.....	34 6	31 9	31 0	29 2	28 3	28 9	29 0	36 0	27 7
1895.....	33 3	31 3	28 3	28 3	27 6	26 9	26 9	34 6	25 10
1896.....	33 6	30 6	28 9	28 0	27 6	27 9	29 0	37 0	27 4
1897.....	35 6	32 6	30 3	29 3	28 0	27 0	27 6	37 0	26 5
1898.....	31 6	30 9	29 8	28 6	28 2	28 3	28 6	32 1	26 9
1899.....	36 2	31 9	30 3	28 6	27 6	28 0	27 9	37 9	26 9
1900.....	33 6	30 9	30 6	29 6	28 1	28 9	29 2	35 9	27 4
1901.....	34 3	31 10	29 2	28 3	27 7	27 4	27 3	36 3	26 6
1902.....	32 2	32 2	32 2	29 4	28 1	28 1	29 0	34 1	27 6
1903.....	33 0	30 11	30 5	29 5	28 4	29 0	27 11	32 8	26 11
1904.....	36 3	34 5	30 9	29 5	29 5	30 4	29 3	37 4	28 1
1905.....	31 10	30 8	29 7	29 0	28 0	28 5	28 1	33 6	27 1
1906.....	32 4	31 5	29 3	27 11	27 3	27 4	27 6	33 3	26 9
AVERAGE DEPTH FOR EACH MONTH IN THE 30 FOOT CHANNEL. (30 feet at the Extreme Low Water of 1897.)									
	May.	June.	July.	August.	Sept.	Oct.	Nov.	Highest.	Lowest.
1907.....	37 1	35 9	34 3	32 10	32 4	32 9	33 7	38 3	31 10
1908.....	41 5	37 10	33 10	32 10	32 0	31 0	30 6	42 4	30 0

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COST OF SHIP CHANNEL TO DATE.

TABLE showing the Total Cost of the Dredging and Plant, and the Quantities dredged to March 31, 1909.

	Cost of Dredging.	Expenditure for Plant, Shops, Surveys, &c.	Quantities dredged.
	\$ cts.	\$ cts.	Cubic Yards.
MONTREAL HARBOUR COMMISSIONERS, 1851 TO 1888.			
Dredging Montreal to Cap à la Roche to 27½ feet at ordinary low water, and from Cap à la Roche to Quebec to 27½ feet at half tide.....	3,402,494 35	534,809 65	19,865,693
DEPARTMENT OF PUBLIC WORKS.			
Dredging consisting of widening and cleaning up of channel : deepening Cap à la Roche to Cap Charles to 27½ feet at ordinary low water, and dredging at Grondines, Lotbinière and Ste. Croix, 1889 to June 30, 1899.....	829,583 08	486,971 79	3,558,733
Project of 1899:—			
Dredging channel between Montreal and Quebec to 30 feet at lowest water of 1897, also widening to a minimum width of 450 feet, and straightening.			
Fiscal year 1899-1900	100,191 01	265,270 78	1,107,894
" 1900-1901	136,680 83	287,040 04	2,479,385
" 1901-1902	185,429 80	479,731 47	3,098,350
" 1902-1903	255,776 55	277,703 50	6,544,605
" 1903-1904.....	276,958 59	308,765 44	4,619,260
DEPARTMENT OF MARINE AND FISHERIES.			
Fiscal year 1904-1905.....	311,087 93	266,460 33	2,716,220
" 1905-1906.....	431,768 30	125,107 37	4,047,530
" 1906-1907, (July 1, '06, to March 31, '07)	302,677 37	80,613 26	3,001,010
" 1907-1908.....	478,209 66	179,339 78	4,831,875
" 1908-1809.....	497,686 03	209,636 55	5,896,737
	7,208,543 50	3,501,449 96	61,767,292

DREDGES.

Laval (No. 1).—Of the fleet of ship channel dredges this is the oldest. The hull is of wood, constructed in Ottawa in 1894. The buckets are made of cast-steel for work in rock and other hard material.

The dredge was hauled out on the slipway as soon as she came into winter quarters in the autumn of 1907 to have repairs made to her hull, which was also thoroughly caulked and tarred. The machinery was given a complete overhauling and put in good condition for the next season's work.

The details of the operation of this dredge for the fiscal year beginning April 1, 1908, were as follows:—

At the opening of the season of 1908 the dredge was taken down to Cap Levrard and laid out on May 12 where the *Baldwin* (No. 6) had left off the previous season, to widen and deepen the curve, the material consisting of clay and stones.

The *Laval* completed the work at the curve on August 1. She was then laid out on the south half of the Cap Levrard channel opposite the upper brick yards, below Cap Levrard, to widen and deepen the channel, the material being hard clay, stones and some sand. The dredge continued working there until November 10, when she

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was taken up to Varennes and laid out on the upper part of the curve to deepen the channel to 35 feet at L.W. of 1897, the material being soft clay.

On November 25 the *Laval* was taken down to Sorel to go into winter quarters.

In a total of 167 days during which this dredge was at work, her machinery was in actual operation 65 per cent of the full working time.

The percentage of full working time for all the dredges would have been higher but for the unavoidable delays caused during the autumn by fog and smoke, which was the worst experienced, on record, and suspended all operations on the river for days at a time.

The total number of cubic yards removed amounted to 285,200 at a total cost of \$45,768.08, or 16⁰⁴/₁₀₀ cents per cubic yard.

Laurier (No. 2).—The hull of this dredge is also of wood, having been constructed at the government ship-yard at Sorel in 1897. Her buckets are made of cast-steel, especially designed for work in rock and other hard material.

During the winter of 1907-8 this dredge was thoroughly overhauled and her machinery put in good order for the next season's work.

The details of the operations of this dredge for the fiscal year beginning April 1, 1908, were as follows:—

Dredge No. 2 left Sorel on May 4, and was laid out at Champlain to clean up some lumps found in the channel by testing, the material being fine sand. She finished her work at Champlain on June 5, and was then taken down to Cap à la Roche and laid out on the curve where she had left off the previous season to widen and deepen the channel, the material being shale rock and very difficult to remove.

During the months of September and October the dredge lost a great deal of time owing to smoke and fog.

On November 10 No. 2 was taken up to Varennes, where she commenced to deepen the channel to 35 feet at L.W. of 1897.

On November 23 the dredge broke down and was taken to Sorel and put into winter quarters.

The number of days during which this dredge was in operation was 172, and the percentage of time at actual work 62.

During the fiscal year she removed 132,650 cubic yards at a total cost of \$45,-596.77, or 34³⁷/₁₀₀ cents per cubic yard.

Lady Aberdeen (No. 3).—The hull of this dredge is of steel, the vessel complete, having been constructed at the Sorel works in 1900. The buckets are of cast-steel, specially designed for working in rock and other hard material.

During the winter, the dredge was given the usual overhauling.

The details of the operations of this dredge for the fiscal year beginning April 1, 1908, were as follows:—

On April 28 dredge No. 3 left Sorel for Pointe aux Trembles to clean up a few lumps which had been found in the channel by testing, the material being sand and clay. She finished this work on May 27, and was taken down to Cap Charles and laid out on the curve on May 28, where she had left off the previous season, to widen and deepen the curve to 30 feet at L.W. of 1897, the material being shale rock and very difficult to remove. The progress was slower than during the previous season as the material was a great deal harder.

This dredge was very unfortunate in the way of accidents.

On June 3 she had a bad break in her main engine, which caused a delay of a few days.

On July 15 the upper tumbler shaft broke, which necessitated bringing up the dredge to Sorel for repairs. These were completed on the 22nd, and she was taken back to Cap Charles.

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Dredge No. 3 met with another bad accident on July 25, when her buckets came off the frame, which, on being lifted, was found to be very much bent and twisted. This made it absolutely necessary to bring the dredge up to Sorel. The damage was caused by the swell of passing steamers while the lower end of the frame was still resting on the river bottom.

On her arrival at Sorel on July 29, day and night shifts were put on to rush the repairs, the frame having to be practically rebuilt. These repairs were completed on August 20, and the dredge taken down to Cap Charles, where she continued working until November 6. The dredge was then taken up to Sorel to go into winter quarters and to be hauled up on the ways.

In a total of 137 days during which this dredge was at work, her machinery was in actual operation 58 per cent of the full working time.

The total quantity of material dredged amounted to 122,200 cubic yards, at a cost of \$52,238.42 or 42 $\frac{7}{100}$ cents per cubic yard.

Lady Minto (No. 4).—This dredge is of the same type and design as the *Lady Aberdeen*, her hull being also of steel, and her buckets of cast-steel for working in rock and other hard material.

During the winter of 1907-8, this dredge was given a thorough overhauling, and her machinery put in good order for the next season's work.

The details of the operations of this dredge for the fiscal year were as follows:—

The dredge left Sorel on April 28 for Pointe aux Trembles (*en haut*) where she was laid out to clean up some lumps found in the channel by testing, the material being clay and sand. When this was finished the *Lady Minto* was taken down to work at Cap Charles channel and laid out where she had left off the previous season, the material to be removed consisting of shale rock, hard clay, and stones. The dredge continued to work there until November 11, when she was taken up to Sorel and set to work to dredge a shoal which had formed opposite the new coal dock, at the shipyard, St. Joseph de Sorel. The dredging of this shoal was completed on November 14, and the *Minto* was taken down to work in the channel opposite Stone Island light to clean up some lumps found by testing. No. 4 was taken into winter quarters on November 25.

Like all the other dredges of the fleet, No. 4 lost a great deal of time during the autumn on account of smoke and fog.

In the 173 days of work, the actual operations were carried on for 67 per cent of the full working time, and 267,950 cubic yards were removed at a cost of \$48,458.96 or 18 $\frac{1}{100}$ cents per cubic yard.

Lafontaine (No. 5).—The hull of this dredge is of wood, the work of the Sorel shipyard, completed in 1901. Her buckets are made of cast-steel for working in rock and other hard material.

During the winter of 1907-8 she was given a thorough overhauling, and put in good shape for the next season's work. The details of the operations of this dredge for the fiscal year beginning April 1, 1908, were as follows:—

No. 5 left Sorel on May 4, and was taken down and laid out at Batiscan channel to remove some lumps found there and at the anchorage. The dredged material consisted of sand and stones.

The work at Batiscan was finished on May 21, when the dredge was taken to Cap à la Roche, and laid out to work on the curve where she continued operations until November 9, the material being shale rock. This dredge was then towed up river, and placed to work at Varennes curve, deepening the channel to 35 feet at L.W. of 1897, the material removed being soft clay.

The working time of Dredge No. 5 was 173 days, the dredge being in actual operation 65 per cent of the full working time.

The total number of cubic yards removed, amounted to 160,500 at a cost of \$49,056.65 or 30 $\frac{6}{100}$ cents per cubic yard.

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Baldwin (No. 6).—The hull of this dredge is of wood, constructed at the Sorel shipyard in 1902. She has large built-up buckets for work in soft material, but with sufficient teeth to enable the dredge to work in hard-pan, &c.

During the winter of 1907-8 the boilers of this dredge were thoroughly repaired, and her machinery was given a good overhauling.

The *Baldwin* left Sorel on May 4, and was laid out to work on Champlain channel the same day, to clean up sand bars which had formed.

This dredge continued working at Champlain channel until October 6, when she was taken down to Cap Levrard and laid out to straighten, deepen, and widen the Cap Levrard channel, the material consisting of clay and stones.

The *Baldwin* worked at Cap Levrard until November 13, when she was taken up to Ste. Anne de Sorel, and set to work on the traverse to deepen the channel to 35 feet at L.W. of 1897, the dredge material being soft clay.

No. 6 was taken into winter quarters on November 25.

The number of days during which this dredge was in operation was 173, and the percentage of time of actual work, 68.

The total number of cubic yards removed amounted to 390,500, at a cost of \$49,157.43 or 12⁵⁸/₁₀₀ cents per cubic yard.

J. Israel Tarte (No. 7).—This hydraulic dredge was constructed by the Polson Iron Works Company, of Toronto, Canada, in 1902.

The hull is of steel, of the same type and general design as the steel hulls of the elevator dredges.

During the winter of 1907-8 the dredge was given a good overhauling and repairs were made to her four boilers. Fifteen of the discharge-pipe pontoons were hauled out for caulking and painting.

At the commencement of the season of 1908, the *J. Israel Tarte* was placed at the mouth of the Richelieu river to do some filling at the new ship-yard coal wharf. This work she completed on May 9, and was then put into shape for work on Lake St. Peter. The dredge was laid out to begin operations on May 11 between the White buoy and No. 2 curves where she left off the previous season. Her work consisted of widening and deepening the channel, the dredge material being soft clay.

As with all other dredges of the fleet, unavoidable delays were caused during the autumn by fog and smoke.

After completing the widening and deepening between the White buoy and No. 2 curves, No. 7 was laid out to widen and deepen the channel between No. 2 and No. 1 curves, the material also being soft clay. She completed this work on November 3, and as it was then too late in the season to consider placing the dredge to work above No. 3 curve, this part of the lake being very much exposed to bad weather, it was decided to start deepening No. 1 curve to 35 feet at L.W. of 1897.

No. 7 continued working at No. 1 curve until November 14. She was then given a thorough cleaning out before being put into winter quarters.

Notwithstanding the lost time on account of smoke and fog, the season's work was the most successful on record.

In a total of 163 days during which this dredge was at work, her machinery was in actual operation 70 per cent of the full working time.

The total number of cubic yards removed amounted to 3,209,237, at a total cost of \$101,548.47, or 31¹⁶/₁₀₀ cents per cubic yard.

The total number of cubic yards removed by the dredging fleet between Montreal and Quebec during the fiscal year ending March 31, 1909, amounted to 4,568,237, at a total cost of \$391,824.78, or 8⁵⁷/₁₀₀ cents per cubic yard.

New Hopper-Hydraulic Dredge *Beaujeu (No. 8)*, Steel Hull Twin-Screw.—The construction of this dredge was commenced at the Sorel ship yard in 1905. She was

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launched in 1906, and delivered to the operating branch of the department on November 1, 1907.

The dredge was taken down to St. Thomas de Montmagny and placed to work on the St. Thomas channel, where she remained until November 15, 1907, when she was brought back to Sorel to go into winter quarters.

During the winter, alterations were made to the bow anchor winch, to give a quicker motion when winding up chain.

The machinery was given a thorough overhauling and put in good working order for the next season.

The *Beaujeu* left Sorel to begin her 1908 season's work on May 4. She was laid out to work on St. Thomas channel on May 6. On commencing, the dredge unfortunately broke her cutter-head shaft, which necessitated taking her up to Quebec for repairs. These having been completed by the 11th, she coaled up and returned to work at St. Thomas channel on the 13th, but on starting work the cutter-head shaft again broke. It was then decided to take the dredge up to Sorel and have repairs and certain alterations made.

No. 8 arrived at Sorel on the 18th of May, and the necessary repairs were completed by the 25th, when the *Beaujeu* left Sorel for St. Thomas channel, where she arrived the following day and immediately resumed work.

On June 3 this dredge was taken down to Beaujeu channel to remove some lumps composed of sand and clay which were found too difficult for the *Galveston* to pump.

No. 8 continued working at Beaujeu channel until June 13, when she returned to St. Thomas channel and worked very satisfactorily.

From August 12 to 19 the dredge was delayed for repairs to her cutter-head engine, and while these were being made her turbines had new lining put in.

From the 19th August until the 22nd of October the *Beaujeu* worked satisfactorily at St. Thomas channel, except for three short periods, when, on one occasion, she went down the Beaujeu channel to remove some material consisting of sand and clay which was found too difficult for No. 9 to pump.

On October 22 No. 8 was found to be making water; she was, therefore, taken up to Lévis to go into the dry dock for the necessary repairs to her hull. While in dock her boilers and machinery were given a thorough overhauling.

The *Beaujeu* came out of dry dock on November 5, and, after coaling, proceeded down to Beaujeu channel and resumed her work cleaning up lumps which were too hard for No. 9. The weather, however, became very unfavourable on account of the late season, and it was decided to put the dredge into winter quarters.

She left on the 6th November and reached Sorel the following day, when she was immediately laid up for the winter.

Notwithstanding the fact that 1908 was the first season for dredge *Beaujeu*, with an inexperienced crew, new machinery, &c., the results obtained have been most satisfactory, and the dredge has proved herself a credit to the Sorel shipyard.

The working time of No. 8 was from daylight to dark, and the dredge was in actual operation 44 per cent of the full working time.

During the season the dredge worked 108 days at St. Thomas channel, and made 332 loads, which amounted to 651,800 cubic yards, the material consisting of clay and stones.

The dredge also worked twenty-seven days at Beaujeu channel, and made sixty-five loads, which amounted to 126,000 cubic yards, the material being sand, clay and stones.

The total number of days during which the dredge worked was 135, making 398 loads, or a total of 777,800 cubic yards, at a total cost of \$57,801.88 or 74³/₁₀₀ cents per cubic yard.

Suction hopper dredge *Galveston* (No. 9) steel hull, twin screw.—During the winter of 1907-8, this dredge was given a thorough overhauling, and her machinery put in good order for the next season's work.

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The details of the operations of this dredge for the fiscal year beginning April 1, 1908, were as follows:—

The *Galveston* left Sorel on May 5, for Quebec, where she arrived on the same day. She started for Beaujeu channel, Crane island, on the following morning, to commence operations.

During the season, the dredge was beached several times for repairs.

The *Galveston* worked at Beaujeu channel until November 7, when orders were received to proceed to Sorel to lay up for the winter.

No. 9 left Quebec on November 9, for Sorel. On the way up, the dredge was laid out at St. Croix Bar to make a trial load. The material was found to be very difficult to pump, being composed of very hard sand, with many stones.

No. 9 reached Sorel on November 12, and was immediately laid up for the winter.

During the season, the *Galveston* worked 159 days, her hours of operation being from daylight until dark. She was in actual operation 50 per cent of the full working time, and made 437 loads, amounting to 550,700 cubic yards, the material being sand, some soft blue clay and stones, at a total cost of \$48,059.37, or $87\frac{7}{100}$ cents per cubic yard.

The total number of cubic yards removed by the *Beaujeau* (No. 8) and the *Galveston* (No. 9) below Quebec, during the fiscal year ending March 31, 1909, amounted to 1,328,500 at a total cost of \$105,861.25 or $79\frac{6}{100}$ cents per cubic yard.

The total number of cubic yards removed by the whole of the dredging fleet amounted to 5,896,737, at a total cost of \$479,686.03 or $84\frac{4}{100}$ cents per cubic yard.

Progress of dredging operations at the date of writing, the close of the season, 1908.

Locality.	Distance English miles.	Total length requiring dredging.	Length dredged in 1908.	Total length of 30 foot channel dredged.	Length yet to be dredged.
		Miles.	Miles.	Miles.	Miles.
Division 1:— Montreal to Sorel.....	45	22·90	.....	22·90	All completed.
Division 2:— Sorel to Batiscan.....	36	12·45	.....	12·45	All completed.
Division 3:— Lake St. Peter.....	20	18·00	4·22	*5·38 †12·62	All completed. 5·38 to be widened. 4·75
Division 4:— Batiscan to Quebec.....	59	10·00	0·80	5·25	4·75
Division 5:— Quebec to The Traverse.....	60	6·65	1·25	2·00	4·65
Total.....	220	70·00	6·27	60·60	9·40

* Not widened.

† Widened.

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PROGRESS of Dredging Operations at date of writing, the close of the season, 1908.

LOCALITY.	LENGTH OF DREDGING.		Cubic yards yet required to be done.
	Required.	Done.	
	Miles.	Miles.	
Division 1:—			
Longueuil Shoal.....		1 10	
Longue Pte. to Pte. aux Trembles (E.H.).....		5 05	
Ile Ste. Thérèse.....		0 40	
Varennes to Cap. St. Michel.....		3 00	
Cap. St. Michel to Vercheres.....		4 50	
Vercheres Traverse.....		1 10	
Vercheres to Contrecoeur.....		1 70	
Contrecoeur Channel.....		6 05	
Total.....		22 90	
Division 2:—			
Sorel to Ile de Grace.....		4 40	
Stone Island.....		1 10	
Ile aux Raisins.....		0 25	
Lake St. Peter (see Div. 3).....			
Port St. Francis.....		0 50	
Three Rivers.....		0 50	
Cap. Madeleine to Becancour.....		1 55	
Becancour to Champlain.....		2 25	
Champlain to Pte. Citrouille.....		1 30	
Batture Perron.....		0 60	
Total.....		12 45	
Division 3:—			
Lake St. Peter.....		*5 38 †12 62	3,300,000
Total.....		18 00	3,300,000
Division 4:—			
Batiscan to Cap Levrard.....	0 20	2 80	50,000
Cap à la Roche Channel.....	1 10	0 90	500,000
Pouiller Rayer.....	0 80	0 40	175,000
Cap Charles.....	0 65	0 25	210,000
Grondines.....	0 80		200,000
Lotbinière.....		0 40	
Cap Santé.....		0 20	
Ste. Croix.....	0 60	0 30	150,000
St. Augustin.....	0 60		150,000
Total.....	4 75	5 25	1,435,000
Division 5:—			
Quebec to the Traverse.....	4 65	2 00	3,200,000
Total.....	4 65	2 00	3,200,000
Totals.....	9 40	60 60	7,935,000
Cubic yards yet to be done.....			7,935,000
Cubic yards done.....			61,767,292
Total.....			69,702,292

* Not widened.

† Widened.

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RIVER ST. LAWRENCE SHIP CHANNEL—Continued.

CLASSIFICATION of Disbursements for Fiscal Year ended March 31, 1909--Concluded.

Vessels.	Fuel.	Wages.	Board.	Stores and materials.	Repairs and labour.	Expenditure: new plant, rebuilding shipyards, &c.	Proportion of general and office expenses, &c.	Expenditure for each vessel.	Stone-lifter service, &c., floating shop, elevator dredges.	Tug service.	Inspection towing, sweeping, &c.	Total cost of operations of each dredge and plant during Fiscal Year.	Total expenditure on different appropriations.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ tts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Stone lifter No. 2	25 16	1,281 14	281 76	507 52	1,093 56	.....	169 06	3,358 20	.....	.....	.....	.....	.....
" No. 3	.....	1,065 29	414 84	536 79	496 15	.....	133 23	2,646 30	.....	.....	.....	.....	.....
Floating shop... dredges.	207 00	387 40	145 47	252 30	15 42	.....	53 44	1,061 03	.....	.....	.....	.....	.....
Str. <i>Lady Grey</i> (ice breaking and emergency tug).....	6,434 06	12,666 80	4,714 80	5,761 14	8,305 00	.....	2,010 96	39,952 76	.....	.....	.....	.....	39,952 76
Construction for dredging fleet—													
Floating machine shop.....													
Str. <i>De Lévis</i> , steering gear.....						3,445 05							
Tug <i>Jessie Hume</i>						594 73							
Construction 2 flat scows 50 feet.....						681 12							
Construction 1 flat scow 60 feet.....						1,168 14							
Construction 1 pontoon anchor scow.....						3,214 00							
Construction 2 dump scows 200 cubic yds.....						7,408 90							
Reconstruction dump scows Nos. 8 & 10.....						26,704 93							
Improvements to Sorel shipyard—						4,474 10							47,691 03
Boiler shop, new tools and machinery.....						9,930 95							
Machine shop, new tools and machinery.....						250 76							
Saw mill, new tools and machinery.....						1,593 54							

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RIVER ST. LAWRENCE SHIP CHANNEL—Continued.

DETAILS of Dredging, Locality and Cost per Cubic Yard.

Dredges.	Total cost of operations and plant during Fiscal Year.	Number of days in operation each dredge.	Cost per day, operations and plant.	Days working each locality.	Cost of work, each locality.	Total cost of operations.	Number of cubic yards dredged in each locality.	Total cubic yards.	Cost per cubic yard.	Average cost per each dredge.	Kind of material dredged.	Locality of dredging.
<i>Laval</i> (No. 1).....	\$ cts. 45,768 08	167	\$ cts. 274 06	154	\$ cts. 42,205 29	\$ cts. 45,768 08	261,600	.....	16 13	Cts.	Hard clay, stones and sand.	Cap Levard Channel.
<i>Laurier</i> (No. 2).....	45,596 77	172	265 09	13	3,562 79	45,768 08	23,600	285,200	15 09	16 04	Soft clay	Varennes Curve.
<i>Lady Aberdeen</i> (No. 3)	52,238 42	137	381 30	27	7,157 64	.....	18,300	.....	39 11	.....	Sand (cleaning up).....	Champlain.
				133	36,257 97	.....	103,150	.....	34 18	.....	Shale rock	Cap à la Roche Curve.
				12	3,181 16	45,596 77	11,200	132,650	28 40	34 37	Soft clay	Varennes Traverse.
<i>Lady Minto</i> (No. 4)...	48,458 96	173	280 10	26	9,913 87	.....	35,400	.....	28 00	.....	Clay and sand	Pte. aux Trembles Channel.
				111	42,324 55	52,238 42	86,800	122,200	48 76	42 74	Shale rock and stones	Cap Charles Curve.
<i>Lafontaine</i> (No. 5)....	49,056 65	173	283 56	15	4,253 47	.....	10,050	.....	42 32	.....	Clay and sand	Pte. aux Trembles Channel.
				143	40,549 71	.....	138,900	.....	29 19	.....	Shale rock and stone	Cap Charles Channel.
				15	4,253 47	48,458 96	11,550	267,950	13 43	18 08	Soft clay (cleaning up)...	Stone Island.
<i>Baldwin</i> (No. 6).....	49,157 43	173	284 14	15	4,253 47	49,056 65	318,500	160,500	36 82	30 56	Clay and stones	Batiscan Channel.
				32	9,092 75	.....	39,300	.....	23 13	.....	Shale rock	Cap à la Roche Curve.
				10	2,841 49	49,157 43	32,700	390,500	8 68	12 58	Soft clay	Varennes Traverse.
<i>J. Israel Turle</i> (No. 7)	101,548 47	163	622 99	148	92,203 52	.....	3,166,250	.....	2 91	.....	Sand (cleaning up).....	Champlain Channel.
				15	9,344 95	101,548 47	42,987	3,209,237	21 73	3 16	Hard clay, stones and sand.	Cap Levard Channel.
											Soft clay	Ste. Anne Traverse.
											Soft blue clay	White Buoy to Curve No. 1
											"	Curve No. 1 L. S. P.

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<i>Beaujeu</i> (No. 8),...	57,801 88	135 428 16	27	11,560 38	126,000	9·17	(Sand, soft blue clay and stones, Clay and stones.....	St. Thomas Channel.
			108	46,241 50	57,801 88	651,800	777,800	7·09		
<i>Galveston</i> (No. 9),.....	48,059 37	159 302 26	159	48,059 37	.....	550,700	550,700	8·72	Soft blue clay and stones.	Beaujeu Channel.
	497,686 03	1,452	1 452	497,686 03	497,686 03	5,896 737	5,896,737			

RIVER ST. LAWRENCE SHIP CHANNEL.

ABSTRACT of work of Dredging Fleet during the Fiscal Year ended March 31, 1909.

Dredge.	Locality of Dredging.	Time of Service.	Nominal working time, 24 hours per day.	Hours actual dredging.	Number of scows filled.	Number of cubic yards dredged (scow measurement).	Depth of dredging at low water.	Width in feet.	Character of Soil.	Remarks.
		Days.	Hours.				Ft. In.	Feet.		
<i>Laval</i> (No. 1).....	Cap Lévrard (curve and channel).....	154	3,384	2,222½	1,579	261,600	30 0	450 to 600	Hard clay and stones and some sand.....	Capt. P. Matte.
	Varennes Curve.....	13	288	161	118	23,600	35 0	500	Soft clay.....	
		167	3,672	2,383½	1,697	285,200				
<i>Laurier</i> (No. 2)....	Champlain.....	27	600	435½	122	18,300	30 0	450	Sand, cleaning up.....	Capt. O. Gendron.
	Cap à la Roche Curve.....	133	2,916	1,778½	669	103,150	30 0	450 to 550	Shale rock.....	
	Varennes Traverse....	12	264	114½	56	11,200	35 0	500	Soft clay.....	
		172	3,780	2,328½	847	132,650				
<i>Lady Aberdeen</i> (No. 3).	Pointe aux Trembles Channel.....	26	576	395½	177	35,400	30 0	450	Clay and sand.....	Capt. O. Gaucher.
	Cap Charles Curve....	111	2,436	1,330½	434	86,800	30 0	600	Shale rock and stones...	
		137	3,012	1,726½	611	122,200				
<i>Lady Minto</i> (No. 4)....	Pointe aux Trembles Channel.....	15	336	200½	71	14,200	30 0	450	Clay and sand.....	Capt. B. Ladebauche.
	Cap Charles Channel.	151	3,312	2,263½	206½	239,150	30 0	450	Shale rock and stones....	
	Stone Island.....	7	156	87½	73	14,600	30 0	450	Soft clay.....	
		173	3,804	2,562½	350½	267,950				

Cleaning up.

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<i>Lafontaine</i> (No. 5)	15 143 13	336 3,132 336	206½ 2,102 168½	33½ 463 38½	10,050 138,900 11,550	30 30 35	0 0 0	450 450 to 550 500	Clay and stones. Shale rock. Soft clay.	Capt. A. Marcotte.
	173	3,804	2,477	535	160,500					
<i>Baldwin</i> (No. 6)	131 32	2,886 708	2,087¾ 360	1,073 131	318,500 39,300	30 30	0 0	450 450	Sand. Hard clay and stones, some sand.	Capt. L. Dauphinais
	10	216	139	109	32,700	35	0	450	Soft clay.	Cleaning up.
	173	3,804	2,586¾	1,318	390,500					
<i>J. Israel Tarte</i> (No. 7).	148 15	3,252 336	2,249 50	.....	3,166,250 42,987	30 35	0 0	450 600	Soft blue clay. "	Capt. J. S. Michaud
	163	3,588	2,299	.....	3,209,237					
<i>Beaujeu</i> (No. 8)	27	.....	.....	No. of Loads.	126,000	30	0	1,000	Sand, some soft blue clay and stones.	Capt. A. Bourget.
	108	.....	.....	332½	651,800	30	0	1,000	Clay and stones.	
	135	.....	.....	398½	777,800					
<i>Galveston</i> (No. 9)	159	.....	.....	437	550,700	30	0	1,000	Sand, some soft blue clay and stones	Capt. Z. Caron.
	.....	.....	.....	.....	5,896,737					

DREDGING PLANT.

The following is a description of the dredging plant in November, 1908, owned and operated by the Department of Marine and Fisheries in connection with the River St. Lawrence ship channel:—

DREDGES.

The Elevator Dredge 'Laval' (No. 1), wooden hull.

Length over all, 150 feet.
Breadth of beam, 30 feet.
Depth of hold, 14 feet.
Average draught, 11 feet.
Greatest working depth, 42 feet.
Hull built in Ottawa in 1894.
Steel buckets.
Working capacity per day in hard material, 1,000 or 2,000 c. yds.

The Elevator Dredge 'Laurier' (No. 2), wooden hull.

Length over all, 163 feet.
Breadth of beam, 32 feet.
Depth of hold, 14 feet.
Average draught, 10 feet.
Greatest working depth, 45 feet.
Built at Sorel shipyard in 1897.
Steel buckets.
Working capacity per day in hard material, 1,000 to 2,000 c. yds.

The Elevator Dredge 'Lady Aberdeen' (No. 3), steel hull.

Length over all, 148 feet.
Breadth of beam, 32 feet.
Depth of hold, 13 feet.
Average draught, 8.5 feet.
Greatest working depth, 42.5 feet.
Built at Sorel shipyard in 1900.
Steel buckets.
Working capacity per day in hard material, 1,000 to 2,000 c. yds.

The Elevator Dredge 'Lady Minto' (No. 4), steel hull.

Length over all, 148 feet.
Breadth of beam, 32 feet.
Depth of hold, 13 feet.
Average draught, 8.5 feet.
Greatest working depth, 42.5 feet.
Built at Sorel shipyard in 1900.
Steel buckets.
Working capacity per day in hard material, 1,000 to 2,000 c. yds.

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The Elevator Dredge 'Lafontaine' (No. 5), wooden hull.

Length over all, 168 feet.

Breadth of beam, 32 feet.

Depth of hold, 14 feet.

Average draught, 9 feet.

Greatest working depth, 45 feet.

Built at Sorel shipyard in 1901.

Steel buckets.

Working capacity per day in hard material, 1,000 to 2,000 c. yds.

The Elevator Dredge 'Baldwin' (No. 6), wooden hull.

Length over all, 165 feet.

Breadth of beam, 34 feet.

Depth of hold, 14 feet.

Average draught, 8 feet.

Greatest working depth, 42.5 feet.

Built at Sorel shipyard in 1902.

1 cubic yard buckets strengthened for fairly hard material.

Working capacity per day in medium material, 2,500 to 3,500 c. yds.

The Hydraulic Dredge 'J. Israel Tarte' (No. 7), steel hull.

Length over all, 160 feet.

Breadth of beam, 42 feet.

Depth of hold, 12.5 feet.

Average draught, 6 feet.

Length of suction frame, 80 feet.

Greatest working depth, 50 feet.

Built at the Polson Iron Works, Toronto, in 1902.

Working capacity per day in soft material, 12,000 to 20,000 c. yds.

Discharge Pipe and pontoons of Dredge 'J. Israel Tarte' (No. 7).

23 lengths of pipe, 36 ins. diameter by 100 feet long.

1 length of pipe, 36 ins. diameter by 35 feet long.

23 pairs of pontoons for floating pipes, 42 ins. diam. by 90 ft. long.

Winch Scow 'No. 3' for Dredge 'J. Israel Tarte' (wooden hull).

Length over all, 60 feet.

Breadth of beam, 18 feet.

Depth of hold, 6 feet.

Built at Sorel shipyard in 1902.

Winch Scow (wooden hull) for Dredge 'J. Israel Tarte' (with steam boiler and steam winch).

Length over all, 75 feet.

Breadth of beam, 25 feet.

Depth of hold, 5.5 feet.

Built at Sorel shipyard in 1902.

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The Suction Hopper Dredge 'Galveston' (No. 9), steel hull, twin-screw.

Length over all, 233 feet.
Breadth of beam, 39 feet.
Depth of hold, 15 feet 5 inches.
Draught when loaded with 1,800 tons, 14 ft. 9 in. aft. 13 ft. 1 in. fwd.
Greatest working depth, 55 feet. Built in 1904.
Two suction pumps, Dutch type 8 ft. 6 ins. outside diameter.
Working capacity, 1,350 cubic yards in 45 minutes.
Hopper capacity, 1,400 cubic yards.

Sea-going Suction Hopper Dredge 'Beaujeu' (No. 8), steel hull twin screw

Length between perpendiculars, 264 feet.
Breadth of beam, 45 feet.
Depth of hull, 20 feet.
Capacity of hoppers, 2,000 cubic yards in 45 minutes.
Greatest working depth, 65 feet.
Draught when loaded, 15 feet.
Ordinary speed, 9 statute miles.
Built at Sorel shipyard in 1907.

TUGS.

The Ice-breaking and Sweeping Tug 'Lady Grey' (steel hull, twin screw).

Length between perpendiculars, 172 feet.
Length over all, 183 feet 6 inches.
Breadth moulded, 32 feet.
Breadth extreme, 32 feet 3 inches.
Depth moulded, 18 feet.
Draft mean to bottom of flat plate keel (normal) 12 feet.
Draft when ice-breaking, about 13 feet.
Displacement in tons at 12 foot draught, 1,070.
Mean speed at 12 foot draft on 6 runs over measured mile base, 14 knots.
Built by Vickers Sons & Maxim, Ltd., Barrow-in-Furness in 1906.

The Tug 'Frontenac' (composite hull).

Length over all, 113 feet.
Breadth of beam, 23 feet.
Depth of hold, 10 feet.
Average draught, 9 feet.
Built at Sorel shipyard in 1902.

The Tug 'De Levis' (wooden hull).

Length over all, 104 feet.
Breadth of beam, 20 feet.
Depth of hold, 10 feet.
Average draught, 8 feet.
Built at Sorel shipyard in 1902.

The Tug 'James Howden' (wooden hull),

Length over all, 100 feet.
Breadth of beam, 21 feet.
Depth of hold, 10 feet.
Average draught, 7.5 feet.
Built at Sorel shipyard in 1903.

The Tug 'St. Jean d'Iberville' (steel hull).

Length over all, 90 feet.
Breadth of beam, 18 feet.
Depth of hold, 12 feet.
Average draught, 10 feet.
Built at Sorel shipyard in 1897.

The Tug 'Lac St. Pierre' (wooden hull).

Length over all, 100 feet.
Breadth of beam, 21 feet.
Depth of hold, 10 feet.
Average draught, 7.6 feet.
Built at Sorel shipyard in 1901.

The Tug 'Portneuf' (wooden hull).

Length over all, 84 feet.
Breadth of beam, 17 feet.
Depth of hold, 9 feet.
Average draught, 8 feet.
Built in 1875.

The Tug 'Cartier' (wooden hull).

Length over all, 84 feet.
Breadth of beam, 18 feet.
Depth of hold, 9.5 feet.
Average draught, 8 feet.
Built at Sorel shipyard in 1893.

The Tug 'Emilia' (wooden hull).

Length over all, 84 feet.
Breadth of beam, 17 feet.
Depth of hold, 9 feet.
Average draught, 8 feet.
Built at Sorel shipyard in 1898.

The Tug 'Champlain' (wooden hull).

Length over all, 84 feet.
Breadth of beam, 17 feet.
Depth of hold, 9 feet.
Average draught, 8 feet.
Built at Sorel shipyard in 1901.

The Tug 'Jessie Hume' (wooden hull).

Length over all, 72 feet.
Breadth of beam, 17.3 feet.
Depth of hold, 10 feet.
Average draught, 8.5 feet.
Built in Buffalo in 1878.

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The Tug 'Montcalm' (wooden hull).

Length over all, 80 feet.
Breadth of beam, 23 feet.
Depth of hold, 8 feet.
Average draught, 7 feet.
Built at Sorel shipyard in 1903.

The Tug 'Carmelia' (wooden hull).

Length over all, 84 feet.
Breadth of beam, 17 feet.
Depth of hold, 9 feet.
Average draught, 8 feet.
Purchased in 1903.

COAL BARGES.

The Coal Barge 'No. 1' (wooden hull).

Length over all, 120 feet.
Breadth of beam, 24 feet.
Depth of hold, 10 feet.
Built in Sorel shipyard in 1898.

The Coal Barge 'No. 2' (wooden hull).

Length over all, 125 feet.
Breadth of beam, 25 feet.
Depth of hold, 11 feet.
Built at Sorel shipyard in 1900.

The Coal Barge 'No. 3' (wooden hull).

Length over all, 98 feet.
Breadth of beam, 28 feet.
Depth of hold, 12 feet.
Built at Sorel shipyard in 1902.

The Coal Barge 'No. 4' (wooden hull).

Length over all, 98 feet.
Breadth of beam, 28 feet.
Depth of hold, 12 feet.
Built at Sorel shipyard in 1903.

Stone-lifter 'No. 2' (wooden hull).

Length over all, 80 feet.
Breadth of beam, 25 feet.
Depth of hold, 9.8 feet.
Rebuilt at Sorel shipyard in 1897.

Stone-lifter 'No. 3' (wooden hull).

Length over all, 108 feet.
Breadth of beam, 34 feet.
Depth of hold, 14 feet.
Built at Sorel shipyard in 1903.

Sounding Scow (wooden hull).

Length over all, 60 feet.
Breadth of beam, 25 feet.
Depth of hold, 6 feet.
Built at Sorel shipyard in 1898.

Floating Shop (wooden hull).

Length over all, 90 feet, 4 inches.
Breadth of beam, 25 feet.
Depth of hull, 9 feet.
1 forge, 1 shaper, 1 emery wheel, 1 drill, 1 lathe, 1 gasoline, 6 h.p. engine.
Living quarters for 4.
Built in 1908 at Sorel shipyard.

Two Boarding Scows (wooden hulls).

Length over all, 60 feet.
Breadth of beam, 18 feet.
Depth of hull, 7 feet.
Built in 1908, at Sorel shipyard.

One Boarding Scow (wooden hull).

Old dump scow.
Rebuilt in 1899.

Two Hopper Scows (wooden hulls) with hydraulic power for closing gates.

Length over all, 97 feet.
Breadth of beam, 24.5 feet.
Depth of hold, 9 feet.
Capacity, 200 cubic yards.
Built at Sorel shipyard in 1897.

Two Hopper Scows (wooden hulls) with hydraulic power for closing gates.

Length over all, 90 feet.
Breadth of beam, 18 feet.
Depth of hold, 7 feet.
Capacity, 150 cubic yards.
Built at Sorel shipyard in 1898. -

Four Hopper Scows (wooden hulls) with hydraulic power for closing gates.

Length over all, 97 feet.
Breadth of beam, 24 feet.
Depth of hold, 9 feet.
Capacity, 200 cubic yards.
Built at Sorel shipyard in 1899 and 1901.

Five Hopper Scows (wooden hulls) with hydraulic power for closing gates.

Length over all, 98 feet.
Breadth of beam, 24 feet.
Depth of hold, 9.5 feet.
Capacity, 300 cubic yards.
Built at Sorel shipyard, two in 1901, three in 1902.

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Two Hopper Scows (wooden hulls) with hydraulic power for closing gates.

Length over all, 97 feet.

Breadth of beam, 24.5 feet.

Depth of hold, 9 feet.

Capacity, 300 cubic yards.

Built at Sorel shipyard in 1903.

Two Small Flat Scows (wooden hulls) used at the Sorel Shipyard.

20 feet by 40 feet.

One of these with a derrick of five tons lifting capacity.

APPENDIX No. 4.

SOREL SHIPYARD.

G. J. DESBARATS, Esq.,
Acting Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to report on the work performed at the Sorel shipyard during the twelve months of year 1908-9, ended March 31 last.

SPRING WORK, 1908.

The opening of the fiscal year finds the shipyard busy to its full capacity. The wintering of a large dredging fleet and many other vessels is over. Most of the important repairs have been completed in the various shops and the new pieces of machinery or old ones repaired are put on board.

April is devoted to outfitting the several vessels of the dredging fleet, overhauling all the machinery, cleaning and painting, and then to putting on board all necessary supplies and, in the meantime, taking on the crews with their belongings.

In April, 1908, there were at the shipyard the following craft:—

Six elevator dredges, numbered from one to six.

One suction dredge, known as No. 7, with cutter head and discharge pipes.

One suction dredge, known as No. 8, with cutter head, carrying her own load and self-propelling.

One suction hopper dredge, known as No. 9, also self-propelling.

Nine tugs employed as tenders for the above mentioned dredges:—

The Lac St. Pierre, St. Jean Iberville, Montcalm, Portneuf, Champlain, Cartier, Emilia, Carmelia, Jessie Hume.

Three other twin screw wooden boats, to do towing, as well as survey work, sweeping of the channel, and official duty: the *De Lévis*, the *James Howden* and *Frontenac*.

Fifteen dumping scows, numbered from one to fifteen, to serve the elevator dredges.

The discharge pipe of dredge No. 7, consisting of 2,200 feet of pontoons in 100 feet lengths.

Two stone lifters, used as a complement to the dredging fleet and capable of hauling the largest boulders.

Four coal barges, Nos. 1 to 4, of about 375 tons capacity each, continually busy distributing coal to the dredges and tugs, during the season of navigation.

One floating shop kept within reach of the group of dredges for minor repairs.

Three scows with housing on them, serve to lodge the spare crews of the boats, where accommodation is scarce.

Besides the above mentioned craft which had wintered at the Sorel yard, there were also:—

La Canadienne, a vessel of the Hydrographic Survey; the *Shamrock* and *Acetylene*, of the Maintenance of Lights branch; the *Vercheres*, *Hosanna* and *Alpha*, three vessels employed in the construction-of-lights branch; the *Maisonneuve* of the Hydrographic Survey.

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In April, 1908, all of the above vessels were, as I said, being outfitted, overhauled and made ready for the season's work.

The ice of the Richelieu river went, on April 8, and that of the St. Lawrence on April 17. The first dredge to leave the shipyard was the *No. 3* on May 6.

CONSTRUCTION.

In addition to the work required on the vessels of the fleet, there was also the work on the new constructions.

Those on hand at the beginning of the fiscal year were dredge *No. 19*, dipper dredge; tug *No. 22*, for the upper lakes; one floating shop.

Work on the dipper dredge was continued through the whole fiscal year. The vessel was launched in July, 1908, and then the installation of her machinery was begun.

At the same time as the machinery of *No. 19* was being completed, that of *No. 24*, which is to be a duplicate of the first, was kept in hand.

At the end of the fiscal year the main hoisting engine on *No. 19* had been installed, as well as the spud-lifting engines, swinging engine, Wheeler condenser, feed pump and dynamo.

Tug *No. 22*, by April 1, 1908, had her hull almost completed and her woodwork well advanced. The machinery was installed on board, her propeller shafts lined and put in place, her propellers shipped, and on September 25 she was successfully launched. Her installation continued, and in December was far enough advanced to have a trial of her engines in place. By the end of March the vessel was nearing completion.

The name chosen for the new craft known hitherto as *No. 22* was *Lambton*, from the family name of Lord Durham of historical fame.

The floating shop was equipped with a 6-horse power Foos gasoline engine, stationary type, and with shafting and belting, lathe, shaper, drill, emery wheel, smith's forge, blower and necessary tools.

The floating shop was put to actual work in the month of August, 1908, and is found a great convenience for urgent ordinary repairs. One end is set apart as living room for the foreman, a blacksmith.

NEW CONSTRUCTIONS.

Construction No. 20, a stone lifter. Material was received, machinery prepared.

Lighthouse Tender No. 21, although begun in previous year, was, properly speaking, put in hand in 1908, her keel being laid in July of that year.

Dimensions.

The length is 222 feet over all.

Beam moulded, 34 feet 8 inches.

Depth moulded, to upper deck 22 feet.

Draught, when loaded, 15 feet.

Estimated speed, 11½ knots.

The vessel is of steel throughout, has a double bottom 3 feet deep extending through machinery space and bunker, subdivided in three water-tight compartments, that under the boilers forming the reserve feed tank. There are six water-tight bulkheads.

The *No. 21* will be propelled by twin triple expansion engines with cylinders 15 in. 24 in. and 39 in. diameter, respectively, and a common stroke of 24 inches.

The steam is supplied by two marine boilers of the return tube type, 14 feet diameter by 10 feet long.

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There is also a donkey boiler of the vertical type, 5 feet diameter by 9 ft. 2 in. high.

Two flat scows under No. 27 were begun in May, 1908; these scows are 63 feet by 27 by 8.

Construction No. 28 consisted of two wooden scows, capacity 200 c. yds. One is equipped with the government pattern of hopper doors and hinges, the other has the same design as the Harbour Commissioners' scows, the doors being reinforced by an I-beam and the hinges somewhat different.

In both these scows, as in the whole fifteen others already in commission, the doors are operated by means of hydraulic pressure supplied by a pump on board the tug, and carried through a hose to the ram located within the hold of the scow. This works a shaft and opens or shuts the four pairs of doors at the bottom of the hoppers.

Construction No. 29 is a wooden tug of light draft. A model was worked out in September, 1908. The framing was begun in November.

This tug is to have twin-screws and double expansion engines of the type of the *Emilia*. At the end of the fiscal year, the framing of the hull was completed and the planking fairly advanced. The engine frames, cylinders, and several other pieces of the machine were cast.

Construction No. 30. This is a derrick scow for work on the Ottawa river. The scow is 40 feet by 16 feet by 4 feet, carries a stiff leg derrick, with boom of 25 feet and a hand winch. There is a cabin on deck of 8 feet by 10. This scow was built during winter of 1909 for the *Maisonneuve*. At the beginning of April of this year, there remained some painting to be done and a few items of outfitting.

SUMMER WORK, 1908.

Reverting to the vessels of the dredging fleet, these were as usual, kept in efficient working order throughout the season of navigation.

The *De Lévis* was hauled on the slipway for repairs to her rudder.

Dredge No. 3 was brought to the shipyard to have a new upper tumbler installed. Some weeks later, the same dredge through an accident, had her frame broken, which called for extensive repairs.

The tug *Jessie Hume* was also hauled out for painting, and securing the iron sheeting at water line.

VESSELS HAULED OUT, ETC.

The following vessels were also hauled out on the slip-way in the course of season 1908:—tug *Montcalm*, tug *Hosanna*, scow No. 9, tug *Alpha*, scow No. 14, tug *Ottawa*, tug *Reserve*, tug *Champlain*, tug *Emilia*, scow of St. Ours lock, tug *Frontenac*, tug *Vercheres*, scow No. 10, barge *Acetylene*, for repairs either to their propellers, rudders, shafting or hulls.

The stone lifter of the Public Works Department was brought to the shipyard and received a final coat of paint. The piping was overhauled, and two cleats added to the deck equipment.

N.B.—This is outside of the ordinary work of the Marine and Fisheries, but the facilities at the shipyard and central location of Sorel, make it convenient for other departments to have some of their work done here.

MAINTENANCE AND IMPROVEMENTS TO SHIPYARD BUILDINGS AND PLANT.

The buildings of the different shops were kept in repair. The machine shop foundation had to be examined, and as a consequence, the ground plates and bases of studding were renewed; some additional ventilation was provided, the confined spaces underneath being apt to induce rotting of the timbers.

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At the blacksmith shop a crane of 15 feet radius, and 1,500 lbs. capacity was added to the plant.

At the boiler shop, some broken sections of the iron floor were renewed. The furnace was relined with fire brick. A set of powerful bending rolls were purchased and received during the winter. These will be capable of bending boiler plates 1½-inch thick and roll boiler halves 14 feet diameter and 12 feet 6 inches wide.

Building Nos. 2 and 3 had ordinary repairs and painting.

Building No. 4.—Contains offices and stores. Alterations were made to increase space available for offices; in summer 1908, the foundation was repaired; the bottom stringer being rotten, had to be renewed.

Building No. 5, Machine shop.—Repairs were made to soil plate, as the woodwork was decaying.

Buildings Nos. 6, 7, 8, 9, 10 11, 12, 13, 14, 15, 17, 18 and 19 were all painted during the summer of 1908.

Shipyard railway.—The narrow gauge track received new extensions, one line being built from the saw-mill to the boiler house, No. 2, to carry the slabs from the mill to the fire. One line of track was also laid alongside of the standard gauge railway siding and extended to the wharf No. 4. These two new lines were connected with the previously existing lines, and also with the new dry kiln, and the shed for dry lumber.

Six new switches, two right angle crossings and about 2,000 feet of new track were laid. Planking was renewed and crossings added on the old track, wherever necessary.

Wharf No. 4.—Which is the newest and largest of the four at the shipyard, was filled at the rear, with material dredged at high water, by *Dredge No. 7*, and discharged through its floating pipe.

The anchorage of the cribwork was added to by driving groups of piles and binding same with chains and rods to the loaded platform of the wharf. The earth filling was levelled, and a wooden floor laid on top. The first cargo of coal was placed there in November, 1908.

NEW BUILDINGS.

Four new buildings were erected in the course of the year in order to meet the growing requirements. One known as No. 22 is a store house for castings large and small; there are two floors 50 by 32 feet.

In connection with this store-room, there is a plank platform 100 feet by 36 feet, where heavy castings are stored, while waiting to be brought to the machine shop near by. The whole is inclosed by a wire fence 100 by 80 feet, with gates under lock and key, so as to ensure correct distribution of all castings issued to the several constructions.

Another new building is No. 23. The dry kiln, which existed before, had become unequal to the needs of the shipyard. A new one was built in 1908. There are two compartments, 10 feet by 60 feet, with 1,600 feet in each, of 1½-inch piping. The kiln is capable of taking alternately or at same time 18,000 feet of lumber. It is equipped with necessary ventilators and means of regulating the heat and evaporation.

Building No. 20 is a double pitched roof building 51 feet long by 25 feet, with wide sliding doors on either side, and serves for storing lumber after it has been dried in the kiln, or dressed at the mill, and is wanted as a reserve. The narrow gauge track runs along the doors on the south side.

Building No. 21, or boiler-room No. 2, also erected in 1908, is a sort of temporary housing for two boilers of the locomotive type. These are used to consume the slabs

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and sawdust; the steam generated serving to heat the dry kiln, and also for the heating, in winter time, of the sawmill, paint shop, asbestos shop and mould loft.

The boilers rest on a concrete foundation which has been made permanent from the first and will allow the superstructure, now of rough boards only, to be lined with brick or concrete, at some future time.

This boiler-room No. 2 is connected with the sawmill by a square wooden box, carried on posts, through which the sawdust and shavings are blown into a large bin in the boiler-room. It is also connected by steam pipes with asbestos shop and adjoining buildings.

The northern end of the grounds is gradually being occupied by new buildings. As a consequence the extension of the narrow gauge track, mentioned above, and also the increasing of the fire protection were necessary.

WATER WORKS.

One main line 6 inches in diameter, running along the railway track and branching out with 4 inch pipes to wharf No. 4 and to wharf No. 3, with one hydrant on each branch, were laid. One hydrant was placed northwest of boiler-room No. 2, and a fourth one at a short distance from buildings No. 15 and 19, where the patterns are stored, as well as the movable equipment of vessels in winter time. Seven hundred feet of pipe were laid and four hydrants, as mentioned above, and two others repaired.

DRAIN.

An earthenware drain pipe was laid from the centre of the space between the mould loft and dry kiln and lumber store to the water's edge, at wharf No. 4. The area between the above mentioned buildings has since been quite free of water, even during the spring thaw and heavy rains.

WINTER WORK, 1908-9.

At the end of the season of 1908, the whole of the dredging fleet enumerated above, together with the new constructions launched during the summer, were at the shipyard as their winter quarters.

In addition to this, were the following: *La Canadienne*, the *Lady Grey*, the *Maisonnette*, the *International*, of the Public Works Department, as well as the vessels of the construction of lights branch: *Vercheres*, *Hosanna*, *Alpha*, and several scows. The *Shamrock* and *Acetylene* also had their repair work done at the yard; and finally the *Constance* was brought here in the fall, to have a new boiler installed.

Following in alphabetical order, are the principal items of repairs executed in the course of the winter:—

Acetylene.—This vessel of the maintenance of lights branch, met with an accident at the close of navigation of 1908, while lifting buoys. The vessel had a load of gas buoys on board and was being towed to Sorel, when she capsized and turned turtle.

The wrecked vessel was towed in that position to Sorel harbour, and an attempt to right her was made by means of the crane of dredge *International*, but was not successful. As the ice was fast forming, and vessels had to go into winter quarters, the operations were postponed until the ice was strong enough to serve as base. Finally on December 29, the vessel was turned right side up and afterwards removed from its position in the channel, a road having to be cut through ice almost two feet thick. The vessel was found to have lost her boiler, and all movable things on deck. The crane was broken by dragging on the bottom, and many connections burst through freezing. The woodwork was out of plumb and partly broken.

The *Acetylene* received a general overhauling, all machinery being dismantled and refitted. A new boiler was installed, new piping laid; the crane was repaired; the

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woodwork was altered so as to include the compressors in the main room of the barge; the roof was repaired, windows and doors touched up or renewed; the sides and hull of the vessel were painted.

Alpha.—Changes to steering apparatus, caulking deck and painting.

Coal barges No. 1, 2, 3 and 4 were caulked and painted. *No. 3* was given a new life boat.

Bronx, a gasoline launch, hauled out for repairs.

Building No. 16, or power house, received coat of paint, during week following Christmas.

Building No. 17, saw-mill.—A circular saw was added, also a saw setting machine.

Tug *Champlain* was hauled out in November and wintered on the ways.

The position of the shaft was straightened and some repairs were made to the boiler. The vessel was scraped and painted and let down in the spring.

Tug *Carmelia* had a new smokestack.

Tug *Cartier*.—The boiler had to be raised for inspection, and was found to need repairs to lower front part and water pan. New plates had to be flanged, the old ones renewed, and of course, connections overhauled, asbestos relaid, &c.

C.G.S. Constance.—Had a new boiler built at the yard and installed. This necessitated cutting through deck, and through roof of boiler room. A wheel house was added to the vessel. The machinery and equipment received at the same time a thorough overhauling.

CONSTRUCTION OF LIGHTS.

Vessel Vercheres.—In order to secure a clear view from pilot house astern, two ventilators were shifted to each side. A new life boat was supplied to the *Vercheres*.

Pile Driver Scow was caulked and painted during winter 1909.

Barge Davis—Had a new boom, repairs to mast, painting and caulking part of deck.

De Levis.—The boiler had to be raised for inspection and needed new plates at lower front and new water pan. The repairs were of the same nature as those on the *Cartier*.

Dredge No. 3 was hauled out in November. The hull was thoroughly scraped and painted in the fall; an additional coat was given after the winter. The vessel was launched only in the spring of 1909.

Dredge No. 7.—There were new water ends fitted on two feed pumps. Repairs to the breasting winches, new cast-iron nipple on the suction pipe of dredge, 3 feet long x 3 feet square.

Jet blowers were installed on boiler, making two boilers so equipped. The pipe pontoons were hauled out and repaired, scraped and painted. The winch scow was hauled out for repairs. The special pontoon connected at the angle of dredge was repaired pending the construction of a new one.

Dredge No. 8 had ordinary repairs and painting.

Dredge No. 9 also had ordinary repairs; a new pair of davits was installed and another repaired. There were also repairs to the crane of the suction pipe; a new gear for the stern winch and strengthening of deck forward.

Tug *Emilia* had repairs to her deck, guards and stanchions.

Tug *Frontenac* had ordinary repairs; was supplied with a new flat-bottomed boat 15 feet x 3 feet. The hull was painted and the gasoline launch was equipped with a new Bellfuss engine.

Hosanna.—Main deck was caulked, spring of 1909, besides painting.

Iberville.—The boiler had to be lifted from its place and repairs to bottom angle and water pan were made. To make the above repairs the woodwork had to be cut and connections, asbestos covering, &c., made anew after boiler was reinstalled.

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International (a spoon dredge of the Public Works Department) wintered here. The three spuds and dipper arm were taken down for repairs.

The spuds were refitted and put in position by means of the shear legs. A new spider for bucket crane was forged and fitted. Foundations of one engine were rebuilt of steel instead of wood, and two dumping scows were repaired.

James Howden.—Boiler had to be lifted for examination and repairs; the front bottom plates had to be renewed. In order to repair the boiler and re-insert the tubes the cylinder engine had to be taken out. As in the case of the other two boilers before mentioned, connections and covering had to be overhauled.

Jessie Hume had a steam steering gear installed; this was taken from the *De Levis*, where a stronger machine was placed last year in view of work below Quebec.

Lady Grey wintered at the yard. There were ordinary repairs; some ventilators added. A 24' x 6' x 26" Clinker built boat was built for her.

The tank was cleaned and painted; the double bottom spaces were cleaned and received a cement wash.

Lake St. Pierre.—The boiler had to be raised for inspection. It was necessary to repair the lower front and water pan. This is the fourth of the series of boilers which had to be repaired in the same manner. There is considerable labour in repair of this kind, the old plates having to be cut in place, the new ones adjusted and tried, and then drilled and riveted, all in the cramped space in the hold of the tugs.

Maintenance of Lights.—Repairs were made to 3 floating lightships of Lake St. Peter channel, 1, 2 and 3. The No. 2 had a new deck, new guards, stanchions, windlass; the other two had minor repairs of the same nature; decks were caulked, woodwork painted.

A mast to carry a light was built and shipped to wharf, Longueuil ferry, near Bellerive Park, Montreal.

Boiler makers, smiths and painters were supplied for repairs to gas buoys.

Maisonneuve wintered at the yard; was hauled on slipway, the boiler was reconstructed; a new rudder made, woodwork repaired and painted, deck was caulked.

Montcalm had repairs to her boiler, which had to be raised in the same manner as described for the *Lac St. Pierre* and *Iberville*.

Shamrock had six new stay tubes fitted; some alterations to woodwork of chart-room, and some repairs to main hoisting winch.

Sounding Scow wintered at shipyard, was hauled out on the slipway, repaired, caulked and painted.

A number of pressing jobs accomplished throughout the year for vessels of the dredging fleet, or auxiliaries, are not detailed in the foregoing report, but form together a considerable total.

The readiness of the shipyard to handle these emergency jobs on short notice, with trained mechanics, is of vital importance to the efficiency of the channel dredging fleet.

General.—All the buildings of the shipyard were painted during the year 1908. The machinery was kept in good order, as well as the water-works system for fire protection. In winter, the roads were maintained, ice was cut around the vessels, and special watch kept over the fleet wintering here. The telephone exchange and electric light lines were kept in constant working order. The compressed air distribution and air compressor were also kept in constant efficiency.

Force Employed.—The force employed varied from 623 to 920 and averaged 729 for the twelve months.

The financial statement herewith, shows the total amount expended at the Sorel shipyard during the fiscal year ending March 31, 1909, to have been \$1,132,279.40.

I have the honour to be, sir,
Your obedient servant,

L. G. PAPINEAU,
Assistant Director of Shipyard.

APPENDIX No. 5.

STATEMENT of Expenditure for the Year 1908-9.

Service.	Vote.	Expenditure.	Totals.
	\$ cts.	\$ cts.	\$ cts.
Ocean and river service—			
Dominion steamers and icebreakers	635,000 00	634,919 76	
Examination of masters and mates	12,600 00	8,244 56	
Rewards for saving life	39,600 00	35,586 13	
Investigation into wrecks	12,000 00	8,569 02	
Schools of navigation	10,000 00	3,599 23	
Registration of shipping	2,000 00	1,471 92	
Removal of obstructions	20,000 00	2,450 27	
Tidal service	32,000 00	31,271 67	
Winter mail service	16,000 00	6,509 97	
Cattle inspection	3,600 00	3,555 99	
Wrecking plants	30,000 00	30,000 00	
Unforeseen expenses	5,000 00	4,166 78	
Naval Militia	10,000 00	8,652 33	
Patrolling waters in northern portion of Canada and Hudson bay	56,000 00	55,733 94	
New icebreaking steamer	365,000 00	363,073 19	
New steamer to replace <i>Lansdowne</i>	75,000 00		
To recoup P. E. Island Government <i>re</i> transportation of hay	4,000 00	4,000 00	
Public Works—chargeable to capital—			1,201,804 76
Ship channel	760,000 00	730,728 10	
Permanent piers in Lake St. Peter, &c	100,000 00	94,185 84	
Dredging plant, River St. Lawrence	213,000 00	131,370 64	
Purchase of yard property at Sorel	30,000 00		
Compensation to Wm. Paul, jr.	7,000 00	7,000 00	
Gratuity to the mother of the late J. Carboneau	500 00	500 00	
Lighthouse and coast service—			963,784 58
Agencies, rents and contingencies	33,000 00	31,403 17	
Salaries and allowances to lightkeepers	330,000 00	321,218 91	
Maintenance and repairs to lighthouses	730,000 00	725,013 05	
Repairs to lightships	20,000 00	16,606 14	
Construction of lighthouses and aids to navigation) " apparatus	1,300,000 00	1,223,713 29	
Wireless stations	131,550 00	66,238 07	
Signal service	9,000 00	8,939 35	
Administration of pilotage	31,550 00	31,546 00	
Pensions to retired pilots	3,600 00	3,400 00	
Maintenance and repairs to wharfs	3,000 00	2,338 47	
Maintenance and upkeep of dockyards	50,000 00	45,061 98	
Breaking ice in Thunder bay and Lake Superior	40,000 00	33,692 00	
Salaries of temporary clerks, &c.	17,000 00	7,720 09	
Telephone stations	10,000 00		
Telephonic reporting stations (signal service) Montreal and Father Point	23,500 00	20,273 60	
New steamer for the great lakes and Georgian Bay	150,000 00	147,186 94	
Repairs to maritime road, Gaspé	2,000 00	1,696 59	
Charter of steamers, Lime Kiln Crossing	12,000 00	11,650 00	
Improvements at Parry Sound	30,750 00	23,978 93	
Purchase of land at St. John, N.B.	50,000 00		
Pension to Pilot F. X. Lamarre	150 00	125 00	
New lightship at Point Pelee, Lake Erie	30,000 00		
Signal service for Grosse Ile	1,000 00		
Scientific Institutions and hydrographic surveys—			2,721,801 58.
Meteorological service	122,300 00	120,664 59	
Magnetic observatory	3,200 00	3,052 47	
Montreal "	500 00	500 00	
Kingston "	500 00	500 00	
Hydrographic surveys	170,000 00	130,229 83	
" survey steamer for Pacific coast	45,750 00	41,104 45	
" " " for Gulf of St. Lawrence.	50,000 00	527 96	
Carried forward			296,579 30
			5,183,970 22

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STATEMENT of Expenditure for the Year 1908-9—*Concluded.*

Service.	Vote.	Expenditure.	Totals.
	\$ cts.	\$ cts.	\$ cts.
Brought forward.....			5,183,970 22
Scientific Institutions and hydrographic surveys—			
Marine hospitals.....	55,000 00	54,989 85	
Shipwrecked and distressed seamen.....	3,000 00	2,004 02	56,993 87
Steamboat inspection.....	46,600 00	41,226 47	
Inspection of Dominion Steamers and fog alarms.....	4,500 00		41,226 47
Fisheries—			
Salaries and disbursements of Fishery officers.....	192,900 00	161,756 34	
Fish breeding.....	322,300 00	190,563 19	
Fisheries protection service.....	270,500 00	242,601 14	
Oyster culture.....	7,000 00	3,635 36	
Cold storage.....	60,000 00	32,688 58	
Dog-fish reduction works.....	75,000 00	45,223 88	
Souris fish curing establishments.....	12,000 00	2,324 78	
Canadian Fisheries exhibits.....	16,000 00	4,300 01	
Distributing fishing bounty.....	5,600 00	5,598 09	
Building fishways.....	10,000 00	6,764 22	
Legal and incidental expenses.....	2,000 00	1,970 51	
Georgian Bay laboratory.....	1,500 00	1,500 00	
Fisheries protection service cruiser for Pacific coast.....	225,000 00	8,354 21	
Marine biological stations.....	20,000 00	20,099 70	
Transportation of fresh fish.....	25,000 00	4,232 00	
Fishery commissions.....	15,000 00	7,337 73	
New steamer to replace <i>Osprey</i>	25,000 00	25,000 00	
" " <i>Georgia</i>	20,000 00	18,000 00	
Gasoline launches for British Columbia.....	4,000 00	3,998 85	
Inquiries into fisheries rights (Federal & Prov'l. Gov'ts).....	10,000 00	748 12	
Services of customs officers issuing licenses to U. S. F. vessels.....	700 00	486 60	
International Fisheries commissions.....	5,400 00	4,545 38	791,728 69
Miscellaneous—			
To repay A. Cushing & Co., re seizure of schr. <i>Evolution</i> in 1893.....	800 00	800 00	800 00
Investigation, Marine and Fisheries Department.....	55,000 00	31,316 90	31,316 90
Returns to Parliament.....	500 00	681 02	681 02
Contingencies.....	21,150 00	20,320 92	20,320 92
Civil government salaries.....	122,250 00	163,222 36	163,222 36
Totals.....			6,290,260 45

APPENDIX No. 6

STATEMENT of Revenue of Marine and Fisheries Department for Fiscal Year Ended
March 31, 1909.

Service.	Amount.	Refunds.	Total.
	\$ cts.	\$ cts.	\$ cts.
Harbours, piers and wharfs	18,288 25	484 00	17,804 25
Dominion steamers—			
<i>Champlain.</i>			
Freight, 1,127.86; passengers, 5,699.85; meals, 275.75; berths.	7,103 46		
<i>Minto.</i>			
Freight, 6,171.99; passengers, 3,275.50; meals, 277.10; berths, 487.00; miscellaneous, 332.25	10,543 84	13 52	
<i>Stanley.</i>			
Freight, 6,443.97; passengers, 2,887.00; meals, 334.10; berths, 589.00; extra, 1.00	10,255 07		27,888 85
Winter mail service	123 30		123 30
Examination, masters and mates	4,192 50		4,192 50
Fines and forfeitures	418 00		418 00
Steamboat inspection fund	5,952 96		5,952 96
" engineers certificates	2,014 50		2,014 50
Sick mariners fund	67,483 46	1,234 13	66,249 33
Signal station dues	663 00		663 00
Decayed pilots fund	5,485 88		5,485 88
Pilots expense account	140 00		140 00
Marine register fees	44 42		44 42
Pilots licenses	35 00		35 00
Casual revenue marine	35,584 37	575 46	
" fisheries	3,481 48		38,490 39
Total	171,809 49	2,307 11	169,502 38
Fisheries revenue	75,011 31	2,109 75	72,901 56
Modus Vivendi	9,794 70		9,794 70

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FISHERIES Revenue for Fiscal Year Ended March 31, 1909.

Ontario Sales and Fines.....	\$	760	78	
Quebec Licenses and Fines.....		6,787	91	
Nova Scotia.....		5,394	70	
New Brunswick.....		12,385	89	
Prince Edward Island.....		2,393	66	
Manitoba.....		3,237	22	
Saskatchewan.....		1,185	50	
Alberta.....		1,296	00	
Hudson Bay.....		20	00	
British Columbia.....		41,321	65	
Yukon.....		228	00	
		\$75,011	31	\$75,011 31
Less Refunds:—				
Nova Scotia.....		25	00	
New Brunswick.....		75		
Manitoba.....		14	00	
British Columbia.....		2,070	00	
		\$2,109	75	\$2,109 75
				\$72,901 56
Modus Vivendi				9,794 00
				\$82,695 56

For the Year Ended March 31, 1909, Minor Public Works—Revenue—Wharfs, Piers and Harbours.

Locality.	Wharfinger.	Date of Appointment.	Remuneration Allowed.	Amount.
<i>Ontario.</i>			p.c.	\$ cts.
Blind River.....	W. H. McGauley.....	April 14, 1908.	50	646 42
Bronte.....	J. J. Wilson.....	Oct. 26, 1905..	25	58 77
Bruce Mines.....	W. Fleming.....	April 15, 1902..	25	145 41
Echo Bay.....	T. W. Trotter.....	Oct. 9, 1908..	25	45 79
Goderich.....	W. Marlton.....	Feb. 14, 1894..	25	58 60
Haileybury.....	R. B. Jessup.....	May 8,	25	324 30
Hilton.....	E. Stubbs.....	June 20, 1894..	50	182 51
Honora.....	D. Hay.....	Oct. 26, 1905..	25	13 87
Kingsville.....	W. H. Black.....	Aug. 1, 1902..	25	66 20
L'Orignal.....	E. A. Hall.....	May 23, 1904..	25	202 66
Leamington.....	J. E. Johnson.....	May 23, 1906..	25	119 27
Midland.....	J. Yates.....	Oct. 26, 1905..	25	462 63
North Bay.....	P. Kinsella.....	June 30, 1905..	25	8 60
Oshawa.....	W. T. Henry.....	Aug. 10, 1904..	25	1 42
Pelee Island.....	H. Henderson.....	Feb. 2, 1907..	25	167 59
Pembroke.....	T. Anderson.....	April 27, 1906..	50	100 00
Providence Bay.....	J. McKechnie.....	June 29, 1908..	50	16 50
Richards Landing.....	R. Armstrong.....	June 10, 1907..	50	171 64
Rondeau.....	W. R. Fellows.....	Dec. 17, 1883..	25	33 30
Rosseau.....	A. Monteith.....	Aug. 6, 1908..	50	147 49
Sault Ste. Marie.....	G. S. Boyd.....	April 9, 1897..	\$100 per month during navigation season....	668 89
Sheguiandah.....	F. G. R. Bradbury.....	Aug. 16, 1906..	25	106 19
Southampton.....	Geo. McVittie.....	Aug. 16, 1895..	25	147 73
South Lancaster.....	J. D. Perron.....	May 6, 1907..	25	121 41
Thessalon.....	D. J. Saudie.....	April 22, 1902..	50	170 77
Warton.....	W. Gilbert.....	Nov. 13, 1907..	25	184 20
Harbour dues —				4,376 16
Fort William.....			\$84 75	
Port Arthur.....			35 00	119 75
Total.....				4,495 91

9-10 EDWARD VII., A. 1910

For the Year Ended March 31, 1909, Minor Public Works—Revenue—Wharfs, Piers and Harbours.

Locality.	Wharfinger.	Date of Appointment.	Remuneration Allowed.	Amount.
<i>Quebec.</i>			<i>p.c.</i>	<i>\$ cts.</i>
Anse aux Gascons	S. Chapados	Feb. 16, 1906.	25	89 27
Anse St. Jean	F. Lavoie	May 13, 1903.	\$19 per annum.	46 54
Baie St. Paul	E. Cunningham	Oct. 26, 1903.	25	36 90
Beauport	Under lease			20 00
Berthier	J. Blais	Nov. 7, 1905.	50	87 53
Cap à l'Aigle	A. Dufour	May 11, 1906.	25	22 00
Carleton	B. Leclerc	June 13, 1903.	50	1 82
Chicoutimi	T. Tremblay	May 23, 1901.	\$122 per annum.	200 00
Coteau Landing	E. de Chantal	Feb. 1, 1909.	25	22 51
Grand River	Geo. Beaudin	Nov. 16, 1896.	25	199 93
Hudson	E. W. Mullan	July 13, 1904.	50	47 83
Ile aux Grues	D. Vézina	June 13, 1904.	25	23
Lacollé	R. J. Robinson	Mar. 8, 1894.	25	13 37
Les Eboulements	W. Bouchard	May 7, 1906.	\$29 per annum.	33 00
Longueuil	Eusèbe Denicourt	May 15, 1901.	25	127 41
Magog	D. Peters	June 15, 1906.	50	49 27
Matane	Louis Durette	Aug. 25, 1900.	25	206 24
Murray Bay	J. Gagnon	May 16, 1906.	\$40 per annum.	59 85
New Carlisle	J. Chisholm	April 22, 1902.	50	62 22
Paspébiac	Julien de Caen	Feb. 22, 1908.	50	12 61
Peel Head Bay	S. N. Ray		25	6 53
Percé	E. Bourget	Mar. 11, 1903.	25	233 20
Port Daniel	F. X. Gagnon	Feb. 26, 1907.	\$50 per annum.	56 74
Rigaud	O. Mallette	Oct. 14, 1907.	50	33 69
Rimouski	A. Lavoie	Mar. 27, 1905.	50	118 55
Rivière du Loup	L. J. Puize	Nov. 7, 1905.	\$146 per annum.	192 39
St. Anicet	S. Dupuis	Sept. 14, 1896.	25	11 00
Ste. Anne de Bellevue	M. C. Bezner	May 21, 1908.	50	180 08
St. Alphonse de Bagotville	Thos. Fortier	April 20, 1909.	\$48 per annum.	63 35
St. Jean d'Orléans	L. Lachance	Sept. 26, 1896.	50	15 08
St. Jean Port Joli	J. Ouellette	Nov. 5, 1908.	25	19 26
Ste. Cécile du Eic.	O. Ouellette	Aug. 24, 1900.	25	94 42
St. Laurent d'Orléans	J. Godbout	May 11, 1904.	50	20 15
St. Nicholas	Under lease			25 00
St. Siméon	H. Savard	May 7, 1908.	25	1 46
St. Thomas de Montmagny	L. L. Dionne	Oct. 22, 1896.	25	75
St. Zotique	A. Bissonnette	May 7, 1906.	25	9 48
Tadoussac	A. Gingras	May 29, 1906.	\$30 per annum.	57 20
Refunds				2,477 26
Harbour Dues—				484 00
St. John's			\$118 00	
Sorel			163 00	
				281 00
				3,242 26

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For the Year Ended March 31, 1909, Minor Public Works—Revenue—Wharfs, Piers and Harbours.

Locality.	Wharfinger.	Date of Appointment.	Remuneration Allowed.	Amount.
<i>Nova Scotia.</i>			p. c.	\$ cts.
Babin's Cove.	Alex. Thomas.	Oct. 20, 1897..	25	31 09
Barrington.	J. H. Christie.	Aug. 31, 1896..	25	198 74
Battery Point.	J. W. Ellis.	Nov. 26, 1907..	25	0 62
Bayfield.	R. Grant.	April 23, 1902..	25	24 27
Bear Point.	J. Small.	May 23, 1896..	25	0 43
Belliveau Cove.	St. C. Thériault.	Nov. 24, 1892..	25	126 43
Black Point.	J. P. Littlewood.	Jan. 8, 1894..	25	21 75
Brooklyn.	Jas. McLeod.	Aug. 3, 1904..	25	41 29
Brulé.	Alex. Craig.	Dec. 26, 1898..	25	3 35
Canada Crèek.	H. Dickey.	Aug. 12, 1899..	25	3 03
Centerville.	Alf. Ward.	May 28, 1897..	25	87 58
Church Point.	L. Belliveau.	March 20, 1907..	25	62 41
Delaps Cove.	R. W. McCaul.	Nov. 28, 1889..	25	8 52
Descousse.	L. N. Poirier.	May 31, 1906..	25	36 49
Digby.	W. W. Haden.	April 20, 1897..	25	2,586 88
Freeport.	T. W. Brooks.	Nov. 26, 1907..	25	51 05
Grandville Centre.	H. Roney.	July 6, 1903..	25	67 05
Hall's Harbour.	T. A. Neuville.	Jan. 8, 1897..	25	68 31
Halifax.	C. H. Harvey.	Agent of Dept. ..	..	100 00
Hampton.	C. E. Dunn.	Dec. 22, 1906..	25	18 35
Harbourville.	L. D. Curry.	" 29, 1906..	25	36 57
Horton's Landing.	F. G. Curry.	April 30, 1898..	25	8 87
Jordan Bay.	J. Fredericks.	Feb. 20, 1900..	25	17 77
Kelly's Cove.	J. B. Huskins.	April 11, 1899..	25	0 30
Margaretsville.	D. H. McLean.	July 10, 1907..	25	101 62
Meteghan Cove.	H. F. Robichaud.	May 28, 1897..	25	57 46
Meteghan River.	D. D'Entremont.	" 14, 1897..	25	23 39
Morden.	J. Redgate.	Nov. 16, 1893..	25	6 69
Oak Point, Kingsport.	Under lease. ....	..	..	200 00
Ogilvie.	J. L. Swindle.	March 4, 1907..	25	19 27
Parker's Cove.	S. Anderson.	July 12, 1903..	25	40 23
Pickett's Wharf.	F. A. Eaton.	Aug. 2, 1899..	25	75 45
Plympton.	W. K. Smith.	" 8, 1890..	25	14 90
Port Dufferin.	A. Balcon.	Feb. 17, 1899..	25	16 96
Port George.	O. Douglas.	June 26, 1900..	25	54 65
Port Hawkesbury.	F. McInnis.	March 20, 1907..	25	377 13
Port LaTour.	C. D. Cook.	Aug. 20, 1904..	25	23 22
Port Lorne.	F. Beardsley.	June 22, 1897..	25	42 24
Port Mouton.	Geo. Cook.	Oct. 28, 1905..	25	7 32
Port Morien.	D. F. Macualet.	Nov. 6, 1906..	7½	461 09
Port Wade.	J. D. Apt.	Sept. 12, 1907..	25	43 02
Sandford.	Alex. Shaw.	May 26, 1903..	25	8 85
Saulnierville.	Jn. T. Saulnier.	Aug. 25, 1888..	25	9 29
Shag Harbour.	R. Nickerson.	Oct. 26, 1905..	25	4 07
Swims Point.	J. F. Duncan.	Jan. 23, 1902..	25	17 90
Victoria.	A. West.	Dec. 4, 1900..	25	5 38
West Pubnico.	C. C. D'Entremont.	March 28, 1898..	25	23 22
Wolfeville.	J. L. Franklin.	Oct. 22, 1901..	25	30 97
Whycocomagh.	D. Livingstone.	Dec. 22, 1906..	25	83 03
Harbour Dues—				
Bridgewater, N.S.			39 00	
International Pier, N.S.			121 50	
				160 50
Grand total.				5,519 00

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For the Year Ended March 31, 1909, Minor Public Works—Revenue—Wharfs, Piers
and Harbours.

Locality.	Wharfinger.	Date of Appointment.	Remuneration Allowed.	Amount.
<i>New Brunswick.</i>			p. c.	\$ cts.
Anderson's Hollow.....	W. C. Anderson.....	Feb. 13, 1899...	25	108 13
Campbellton.....	Geo. E. Asker.....	May 11, 1904....	25	1,970 01
Caraquet.....	Henri Friolet.....	Sept. 11, 1906....	25	30 21
Cape Tormentine.....	N. B. Riley.....	June 25, 1905....	25	599 08
Dalhousie.....	W. J. Smith.....	June 27, 1891....	25	264 67
Hopewell Cape.....	Geo. D. Wilson.....	April 10, 1899....	25	51 59
Tracadie.....	Prosper Savoy.....	Sept. 23, 1889....	25	51 13
Two Rivers.....	W. Wilbur.....	Jan. 8, 1894....	25	1 84
				3,082 66
<i>Prince Edward Island.</i>				
Annandale.....	W. C. Jenkins.....	May 4, 1897....	25	82 53
Bay View.....	J. Harrington.....	Oct. 2, 1885....	25	1 61
Belfast.....	Jas. F. Halliday.....	May 1, 1901....	25	62 03
Chapel Point.....	R. McCormack.....	Sept. 18, 1885....	25	17 88
China Point.....	W. S. N. Crane.....	Sept. 18, 1885....	25	39 47
Charlottetown.....	A. Lord.....	Agt. of Dept.		730 32
Clifton.....	Jn. Gunn.....	May 24, 1900....	25	26 25
Crapaud and Victoria.....	E. McKinnon.....	July 7, 1897....	25	220 16
Georgetown.....	R. R. Jenkins.....	Oct. 14, 1892....	25	10 23
Haggerty's Wharf.....	C. Fisher.....	March 27, 1908....	25	32 71
Hickey's.....	M. Webster.....	Oct. 22, 1896....	25	43 65
Higgin's Shore.....	J. J. Henry.....	Nov. 9, 1891....	25	1 77
Hurd's Point.....	T. Montgomery.....	Aug. 16, 1901....	25	63 73
Kier's Shore.....	W. Hodgson.....	June 10, 1895....	25	136 42
Lambert and Stevens.....	W. Johnston.....	May 3, 1900....	25	7 50
Murray Harbour, North.....	J. McKinnon.....	Jan. 27, 1896....	25	4 99
Murray Harbour, South.....	John Bull.....		25	3 00
North Cardigan.....	R. J. Steele.....	May 1, 1901....	25	63 68
Pownal.....	M. M. Haley.....	Oct. 13, 1896....	25	31 33
Red Point.....	A. Smith.....	April 3, 1900....	25	16 73
Sturgeon Pier.....	N. Randall.....	Dec. 31, 1908....	25	32 22
Tignish.....	A. G. Gaudet.....	Aug. 23, 1898....	25	28 74
Vernon River.....	W. M. Forbes.....	April 22, 1902....	25	48 65
Wood Island.....	Jas. Young.....	April 10, 1899....	25	5 27
				1,710 92

For the Year Ended March 31, 1909, Minor Public Works—Revenue—Wharfs, Piers
and Harbours.

Locality.	Amount.
<i>British Columbia.</i>	
	\$ cts.
Comox (Harbour dues).....	139 00
Ladysmith (Harbour dues).....	1 00
Nanaimo " ".....	97 50
Total.....	237 50

SESSIONAL PAPER No. 21

LIST of United States Fishing Vessels to which Licenses were issued under the Act, intituled, "An Act respecting Fishing Vessels of the United States of America," during the fiscal year ended March 31, 1909.

Vessel.	Port of Registry.	Tonnage.	Port of Issue.	Amount.
				\$ cts.
Viola	Beverly, Me.	14	Yarmouth, N. S.	21 00
Maxime Elliot	Gloucester, Mass.	75	Shelburne, N. S.	112 50
Quickstep	Boston, Mass.	75	Digby, N. S.	112 50
Marjorie Turner	Portland, Me.	44	Yarmouth, N. S.	66 00
Elector	Gloucester, Mass.	84	Pubnico, N. S.	126 00
Indigin	"	89	Shelburne, N. S.	133 50
Dickerson	Southwest	23	Yarmouth, N. S.	34 50
Ella M. Goodwin	Gloucester, Mass.	86	Sand Point, N. S.	129 00
J. W. Parker	Boston, Mass.	96	"	144 00
Susan & Mary	"	83	Halifax, N. S.	124 50
Tattler	Gloucester, Mass.	125	Lockeport, N. S.	202 50
Lizzie Maud	Vinal Haven.	48	Yarmouth, N. S.	72 00
Senator	Gloucester, Mass.	74	Pt. Mulgrave.	111 00
Margaret	"	79	Canso, N. S.	118 50
Yakima	"	71	"	106 50
Cavalier	"	96	Port Hawkesbury, N.S.	144 00
Richard	"	90	"	135 00
A. R. Lawson	"	85	Lockeport, N. S.	127 50
Georgiana	Boston, Mass.	87	Pubnico, N. S.	130 50
Harvard	Gloucester, Mass.	76	Liverpool, N. S.	114 00
Waldo L. Stream	"	81	Port Hawkesbury, N.S.	121 50
Arbutus	"	86	Liverpool, N. S.	122 00
Selma	Boston, Mass.	87	Port Hawkesbury, N.S.	130 50
Vera	Gloucester, Mass.	77	"	115 50
Dictator	"	92	Canso, N. S.	138 00
Cath. Burke	Boston, Mass.	92	"	138 00
Mystery	Plymouth, Me.	78	"	117 00
Gossip	Gloucester, Mass.	91	"	136 50
John Hays Hammond	"	92	Port Hawkesbury, N.S.	138 00
Tacoma	"	71	House Harbour, P. Q.	106 62
Arcadia	"	90	"	135 21
Moornam	Boston, Mass.	82	Pubnico, N. S.	123 00
Mildred Robinson	"	86	Canso, N. S.	129 00
Thos. S. Gorton	Gloucester, Mass.	92	Arichat, N. S.	138 00
Dora A. Lawdon	"	93	Yarmouth, N. S.	139 50
Valkyrie	"	104	Shelburne, N. S.	156 00
Onata	Boston, Mass.	105	North Sydney	157 50
Jas. R. Clark	Beverly, Me.	43	Yarmouth, N. S.	64 50
Preceptor	Gloucester, Mass.	89	White Haven, N. S.	133 50
Gladiator	"	75	Canso, N. S.	112 50
Titania	"	77	Shelburne, N. S.	115 50
Atlanta	"	75	Canso, N. S.	112 50
Mooween	Duxburg	83	Arichat, N. S.	124 50
Jas. A. Garfield	Gloucester, Mass.	50	Port Hawkesbury	75 00
Mary Edith	Boston, Mass.	51	Liverpool, N. S.	76 50
John R. Bradley	Gloucester, Mass.	80	Tusket Village	120 00
Fannie A. Smith	"	87	Amherst, Mag. Is.	131 37
Jennie B. Hodgden	"	85	Yarmouth, N. S.	127 50
Elizabeth N.	Bucksport	153	St. Peters, P. F. I.	153 00
Agnes	Gloucester, Mass.	75	North Head, N. S.	112 50
Paragon	"	80	St. John, N. B.	120 00
Lillian	Boston, Mass.	95	North Sydney	142 60
M. U. Nunan	Cape Porpoise	43	Liverpool, N. S.	64 50
H. F. Curtis	Gloucester, Mass.	85	Shelburne, N. S.	127 50
T. M. Nicholson	Bucksport, Me.	90	Arichat, N. S.	135 00
Metamora	Boston, Mass.	81	Canso, N. S.	121 50
Patriot	Gloucester, Mass.	58	Lunenburg, N. S.	87 00
Oliver F. Kilham	Salem, Mass.	43	Liverpool, N. S.	64 50
Gladys & Sabra	Beverly, Mass.	50	"	75 00
Teazar	Gloucester, Mass.	61	Shelburne, N. S.	91 50
Susan & Mary	Boston, Mass.	85	Sand Point, N. S.	124 50
Atalanto	Gloucester, Mass.	74	Louisburg, N. S.	111 00
Waldo L. Stream	"	81	Halifax, N. S.	121 50
James R. Clark	Beverly, Mass.	43	Yarmouth, N. S.	64 50
Smuggler	Gloucester, Mass.	91	Lockport, N. S.	136 50
Hazel R. Hines	"	79	Pubnico, N. S.	118 50
Theodore Roosevelt	"	90	"	135 00
Senator Gardner	"	94	Yarmouth, N. S.	141 00
Viola	Beverly, Mass.	14	"	"

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LIST of United States Fishing Vessels to which Licenses were issued, &c.—*Con.*

Vessel,	Port of Registry.	Tonnage.	Port of Issue.	Amount.
				\$ cts.
J. R. Bradley.....	Gloucester, Mass.....	80	Tusket Wedge, N. S..	120 00
Arkona.....	".....	97	Liverpool, N. S.....	145 50
Mabel D. Hines.....	".....	92	Tusket, N. S.....	138 00
Athelete.....	".....	96	".....	144 00
Orinoco.....	".....	88	".....	132 00
Bohemia.....	".....	86	".....	129 00
Blanche.....	".....	78	".....	117 00
Effie M. Morrissey.....	".....	83	Digby, N. S.....	124 50
J. J. Flaherty.....	".....	124	Tusket Wedge, N. S..	186 00
Claudia.....	".....	79	Liverpool, N. S.....	118 50
Tattler.....	".....	205	Shelburne, N. S.....	202 50
Anne M. Parker.....	".....	206	".....	150 00
Maxine Elliot.....	".....	75	Lockeport, N. S.....	112 50
				9,794 70

STATEMENT of Minor Revenue collected during the Year ended March 31, 1909—Sick
Mariners Dues.

PROVINCE OF QUEBEC.

Gaspé.....	\$ 117 24
Montreal.....	8,036 27
Paspebiac.....	253 66
Percé.....	109 24
Quebec.....	6,226 80
Rimouski.....	300 35
St. Armand.....	1 96
St. Johns.....	1,638 23
Sorel.....	17 88
Three Rivers.....	370 47
	\$17,072 10

PROVINCE OF NEW BRUNSWICK.

Bathurst.....	\$ 76 60
Campbellton.....	750 90
Chatham.....	1,181 19
Dalhousie.....	426 02
Fredericton.....	8 16
Moncton.....	539 00
Newcastle.....	396 42
Sackville.....	211 91
St. John.....	6,506 45
St. Stephen.....	161 72
	\$10,258 37

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STATEMENT of Minor Revenue collected during the Year ended March 31, 1909—Sick
Mariners Dues—*Concluded.*

PROVINCE OF NOVA SCOTIA.

Amherst.. . . .	\$ 366 84
Annapolis.. . . .	209 05
Antigonish.. . . .	0 54
Arichat.. . . .	25 92
Baddeck.. . . .	112 81
Barrington.. . . .	28 37
Glace Bay.. . . .	3 00
Canso.. . . .	202 59
Digby.. . . .	111 19
Halifax.. . . .	11,091 89
Kentville.. . . .	50 30
Liverpool.. . . .	155 64
Lockeport.. . . .	5 30
Lunenburg.. . . .	581 91
North Sydney.. . . .	1,066 36
Parrsboro.. . . .	621 19
Pictou.. . . .	243 90
Port Hawkesbury.. . . .	292 08
Port Hood.. . . .	55 80
Shelburne.. . . .	70 14
Sydney.. . . .	2,993 42
Truro.. . . .	1 88
Weymouth.. . . .	199 24
Windsor.. . . .	1,106 04
Yarmouth.. . . .	512 56
	<hr/>
	\$20,108 06

BRITISH COLUMBIA.

Nanaimo.. . . .	7,445 60
New Westminster.. . . .	94 58
Prince Rupert.. . . .	238 98
Vancouver.. . . .	2,967 65
Victoria.. . . .	8,978 28
	<hr/>
	\$19,725 09

PROVINCE OF PRINCE EDWARD ISLAND.

Charlottetown.. . . .	238 35
Summerside.. . . .	81 49
	<hr/>
	\$319 84

GRAND TOTALS BY PROVINCES.

Quebec.. . . .	\$17,072 10
New Brunswick.. . . .	10,258 37
Nova Scotia.. . . .	20,108 06
British Columbia.. . . .	19,725 09
Prince Edward Island.. . . .	319 84
	<hr/>
Grand Total.. . . .	67,483 46

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STATEMENT of Steamboat Inspection Dues Collected for the Fiscal Year Ended
March 31, 1909.

PROVINCE OF ONTARIO.		Amount.
Name of Port.		
Sault Ste. Marie..	\$ 45 68	
Windsor..	138 40	
Total..		\$ 184 08

PROVINCE OF QUEBEC.		
Montreal..	\$ 30 40	
Quebec..	498 32	
Total..		\$ 528 72

PROVINCE OF NEW BRUNSWICK.		
New Brunswick..	Nil.	

PROVINCE OF NOVA SCOTIA.		
Halifax..	\$ 2,572 08	
Kentville..	582 40	
North Sydney..	92 40	
Total..		\$ 3,246 88

PROVINCE OF BRITISH COLUMBIA.		
Vancouver..	\$ 1,546 24	
Victoria..	447 04	
Total..		\$ 19,932 28
Grand Total..		\$ 5,952 96

STATEMENT of Marine Register Fees collected for the Fiscal Year ended March 31,
1909.

PROVINCE OF ONTARIO.		Amount.
Name of Port.		
Hamilton..	\$ 0 20	
Kingston..	1 68	
Pictou..	1 64	
St. Catharines..	1 50	
Toronto..	1 64	
Total..		\$ 6 30

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STATEMENT of Marine Register Fees collected for the Fiscal Year ended March 31,
1909—*Concluded*.

PROVINCE OF QUEBEC.

Montreal.. . . .	\$ 7 00	
Quebec.. . . .	11 02	
Total.. . . .		\$ 18 02

PROVINCE OF NEW BRUNSWICK.

St. Stephen.. . . .	\$ 0 25	
Total.. . . .		\$ 0 25

PROVINCE OF NOVA SCOTIA.

Halifax.. . . .	\$ 3 08	
Liverpool.. . . .	0 45	
Lunenburg.. . . .	4 80	
Shelburne.. . . .	1 08	
Yarmouth.. . . .	1 52	
Total.. . . .		\$ 10 93

PROVINCE OF MANITOBA.

Winnipeg.. . . .	\$ 5 20	
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PROVINCE OF BRITISH COLUMBIA.

Victoria.. . . .	2 12	
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PROVINCE OF PRINCE EDWARD ISLAND.

Charlottetown.. . . .	1 60	
Grand total.. . . .		\$ 44 42

STATEMENT of Lighthouse and Coast Dues collected for the Fiscal Year ended March
31, 1909.

PROVINCE OF NOVA SCOTIA.

Name of Port.	Amount.
Halifax.. . . .	\$ 663 00

RESUME OF MINOR REVENUE.

Sick Mariners' Fund.. . . .	\$67,483 46
Steamboat Inspection Fund.. . . .	5,952 96
Marine Register Fees.. . . .	44 42
Signal Station Dues.. . . .	663 00
Grand total.. . . .	\$74,143 84

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APPENDIX No. 7.

METEOROLOGICAL SERVICE.

MAGNETIC OBSERVATORY.

Acting Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit the annual report of the Magnetic Observatory, Agincourt.

Mr. Menzies has continued as observer in charge of this observatory and his zealous attention to duty has resulted as in past years in an almost unbroken record of magnetic changes and he has acted as instructor to many survey officers who have visited the observatory.

The magnetic variometers have been kept in constant operation and the hourly ordinates of declination and horizontal force obtained from the photographic traces have been reduced and tabulated. Weekly absolute determinations of the declination and dip of the needle and fortnightly of the horizontal force have been made in order to check the base line values and determine any changes occurring from loss of magnetism and other instrumental alternations. The magnetic declination has increased in the year by 5'.6 from 5° 52'.6 to 5° 58'.2 west. The horizontal component has decreased slightly while the dip has remained almost stationary at 74° 37'.4. From April to the close of August there were no pronounced magnetic disturbances but a period of disturbance then set in and during September the magnets were almost constantly in motion and large magnetic storms were registered on the 11th and 12th and from the 28th to 30th. From October and through the winter months the magnets at times showed abnormal movements, but the only pronounced disturbances occurred on the last two days of January and from the 26th to 28th of March. Many surveyors and other observers have visited the observatory in order to obtain either base station values for their instruments or to obtain instruction in the use of instruments.

In July last, an observer, Mr. W. E. Jackson, who has been attached to the central office staff for some years was assigned for duty as magnetic and meteorological observer on the D.G.S. *Arctic*, which has been wintering in high latitudes. His instructions were to build a small observatory ashore and devote as much time as possible to magnetic observations.

I have the honour to be,

Your obedient servant,

R. F. STUPART,

Director.

METEOROLOGICAL SERVICE.

METEOROLOGICAL OFFICE,

TORONTO, June 19, 1909.

Acting Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit the thirty-eighth annual report of the meteorological service, this report being for the fiscal year ended March 31, 1909, with Appendices A and B, reports of the St. John and Quebec observatories.

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The number of persons in receipt of pay from the meteorological service during the year for various services performed in connection therewith was 238. Of this number, 24 are employed permanently in the Central office, and with a few others at outside stations have devoted their whole time to the work of the service; others are employed in observing during only a portion of each day, and others again are employed only to attend to the display of storm signals when notified.

There are now in the Dominion 445 stations supplied with more or less complete equipment for meteorological observations, and during the year 410 observers have furnished either daily, weekly or monthly reports to the Central office. At 39 stations where the observers are paid salaries, two or more observations are taken daily, and those taken in the morning and evening are reported by telegraph to Toronto. At 58 other points, chiefly in outlying districts, the observers also receive some remuneration for a more or less extended series of observations. Special observations during the summer months are collected at Winnipeg by telegraph from 25 stations in the western provinces, and together with other information sent from Toronto are embodied in a weather bulletin which is widely disseminated from Winnipeg westward; for this bulletin service remuneration is allowed. Eighty-five persons are paid as storm signal agents, and seven for special duties in connection with the time service.

Over 200 observers report voluntarily, and the thanks of the service are due to these persons who contribute so much valuable information regarding the climate of the Dominion.

CENTRAL OFFICE.

During the past year the work of the central office has been carried on under somewhat unfavourable conditions in temporary quarters, pending the completion of the new meteorological building. The records have been kept in a university building, the workshop and instrument supply department in a building near the old observatory site, and the meteorological reference library has been mostly packed away in boxes. The staff has been increased by the addition of one clerk, Mr. Arthur Ough, and during the summer months several university undergraduates were employed to assist in preparing the annual climatological report.

WEATHER FORECASTING

Weather forecasts covering 36 hours in advance and sometimes a longer interval are issued twice daily throughout the year. The weather charts on which the forecasts are based, have entered on them, information obtained by telegraph from 37 stations in Canada and 64 stations in the United States, also from St. John's, Newfoundland and from Bermuda. The forenoon chart is ready for inspection ordinarily about 9.45, a.m., and the forecast official having drawn the isobars, first issues a bulletin for the maritime provinces, including forecasts for the current and following day for Nova Scotia, New Brunswick and Prince Edward Island and also for vessels leaving for the Grand Banks and for American ports. Then follows a forecast for the western provinces which is telegraphed without delay to Winnipeg, where a local agent who has meanwhile received weather telegrams from some 25 points additional to those received in Toronto, prepares a bulletin, giving a general synopsis of existing weather conditions and also includes all weather reports received, together with the forecasts from Toronto. This bulletin is then distributed in Winnipeg and telegraphed to the more important centres in the prairie provinces. The central office forecast official lastly prepares a bulletin for Ontario and Quebec which is usually despatched about 10.10 and is published very widely by the afternoon press as well as being posted at telegraph offices, post offices and other frequented places. At all the larger towns in these provinces a special effort has been made to have these bulletins exposed on wharfs and docks within easy reach of shipping people and fishermen.

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The evening weather chart like that of the morning is usually ready for inspection about 9.45 and with as little delay as possible a bulletin is prepared for the press and forecasts are issued for all parts of the Dominion exclusive of British Columbia, in which province a local officer under the direction of the superintendent at Toronto issues the forecasts for the Pacific coast. The forecasts are distributed by the telegraph companies to most of the telegraph offices in the Dominion and by arrangement are posted up in a frame hung in a conspicuous place, and nearly every morning journal publishes them, generally on the front page.

During the winter months a very large number of special forecasts were made for shippers of perishable goods, inquiries being received by both telephone and telegraph. Indeed it is certain that a majority of the shippers of such goods in the Dominion now consult the weather service before sending forth consignments.

Special warnings of snow and drift were issued to all Canadian railways whenever it was deemed advisable to do so and various electric railways have made a practice of consulting the central office as to the weather of the coming night, the information supplied enabling them to reduce the working staff on duty to a minimum or on the other hand to take unusual measures to prevent snow blockade.

During the late autumn many telegrams were received from vessel masters wishing to cross the lakes, requesting special forecasts as to probable winds and weather and indeed in some cases asking as to the advisability of starting; also during the autumn several dredges and unseaworthy tows were safely taken from port to port under advice by telephone and telegraph from the Meteorological Office, the captains remaining in shelter until advised that the wind, for a definite period would be light or moderate.

Between April 1, 1908, and March 31, 1909, 1,555 warnings were issued to Canadian ports and of these 89.8 per cent verified. The number of storm signal stations increases annually and applications are being continually received for still more stations. There were fewer storms during the year than the preceding one, but many gales of more or less severity were of course experienced; 102 of the total of 131 being credited to the months of November, December, January, February and March. The warnings were for the most part eminently satisfactory, and few storms occurred without ample notice of their approach being given.

The accompanying table shows the number of weather forecasts issued for each of the various districts and the percentage of verification.

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NUMBER of predictions and percentage of fulfilment in each district for the year ended March 31, 1909.

Month.	ALBERTA.					SASKATCHEWAN.					MANITOBA.					LAKE SUPERIOR.					GEORGIAN BAY.				
	Verified.					Verified.					Verified.					Verified.					Verified.				
	Number of forecasts.	Number fully.	Number partly.	Number not.	Percentage.	Number of forecasts.	Number fully.	Number partly.	Number not.	Percentage.	Number of forecasts.	Number fully.	Number partly.	Number not.	Percentage.	Number of forecasts.	Number fully.	Number partly.	Number not.	Percentage.	Number of forecasts.	Number fully.	Number partly.	Number not.	Percentage.
1908.																									
April.....	75	59	9	7	78.4	75	61	11	3	88.7	77	67	4	6	87.0	97	106	11	7	89.1	128	106	11	11	87.0
May.....	78	66	6	6	88.5	76	60	8	8	84.2	80	54	11	12	76.2	76	88	13	5	84.8	114	88	13	13	82.9
June.....	75	44	20	11	72.0	77	59	12	6	84.4	78	58	14	6	83.3	98	69	17	12	79.1	125	110	13	13	93.2
July.....	84	73	9	2	92.3	84	71	10	3	90.5	85	70	10	5	88.0	124	98	29	6	87.1	129	109	14	14	89.9
August.....	77	57	17	3	85.1	79	60	14	5	81.8	81	67	13	7	90.7	122	88	26	8	82.8	125	106	17	17	91.6
September.....	88	70	14	4	87.5	89	69	15	5	85.9	90	76	10	4	90.0	115	85	22	5	83.5	120	107	12	12	94.2
October.....	81	65	11	5	87.0	81	63	11	7	81.6	85	65	16	4	89.9	118	84	14	7	77.1	135	108	22	22	88.1
November.....	76	64	9	3	90.1	80	69	9	2	91.8	86	69	10	7	86.0	115	93	13	5	86.5	119	98	15	15	88.6
December.....	83	67	14	2	89.1	83	71	9	3	90.9	89	77	8	4	91.0	124	87	28	9	81.4	139	106	19	19	88.8
1909.																									
January.....	78	57	13	8	81.4	78	61	10	7	84.6	80	57	14	9	80.0	98	80	16	8	89.8	114	95	17	17	90.8
February.....	77	59	16	2	87.0	77	63	13	1	90.3	76	62	11	3	88.8	93	78	13	9	90.9	105	89	14	14	91.4
March.....	81	69	12	0	92.6	81	70	9	2	92.0	81	63	16	8	87.6	91	77	12	2	91.2	112	95	12	12	90.2
Totals.....	953	750	150	53	86.6	960	777	131	52	87.8	988	785	140	63	86.5	1315	1012	213	90	85.0	1456	1217	179	179	89.7

NUMBER OF predictions and percentage of fulfilment in each district, for the year ended March 31, 1909.

Month.	LOWER LAKES.				OTTAWA VALLEY.				UPPER ST. LAWRENCE.				LOWER ST. LAWRENCE.			
	Verified.				Verified.				Verified.				Verified.			
	Number fully.	Number partly.	Number not.	Percentage.	Number fully.	Number partly.	Number not.	Percentage.	Number fully.	Number partly.	Number not.	Percentage.	Number fully.	Number partly.	Number not.	Percentage.
1908.																
April.....	128	100	18	85.2	111	93	10	88.3	111	94	8	83.8	121	105	12	91.7
May.....	119	91	16	83.2	93	69	10	79.6	93	68	9	77.9	97	66	15	75.8
June.....	125	113	11	94.8	105	93	10	93.3	105	91	12	92.4	121	96	24	89.3
July.....	129	108	16	89.9	119	106	11	93.7	119	107	11	94.5	123	104	16	91.0
August.....	125	109	14	92.8	117	98	18	91.4	117	101	16	93.2	120	101	14	90.0
September.....	122	109	12	94.3	117	98	17	91.0	117	100	15	91.9	116	94	15	87.5
October.....	137	109	21	87.2	114	90	16	86.0	114	93	14	87.7	130	101	17	84.2
November.....	119	99	13	88.6	116	98	11	88.5	117	93	13	85.8	110	88	15	86.8
December.....	130	110	17	91.9	119	87	29	85.3	119	92	26	88.2	120	96	17	87.1
1909.																
January.....	114	99	14	93.0	98	72	20	83.7	98	71	21	83.2	102	75	21	83.8
February.....	105	91	12	92.4	96	73	19	85.9	97	80	14	89.7	98	79	16	88.8
March.....	112	93	13	88.8	101	79	16	86.1	101	80	17	87.4	109	84	20	86.2
Totals.....	1,465	1,231	177	90.1	1,306	1,056	187	88.0	1,308	1,070	176	88.5	1,367	1,089	202	87.0

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NUMBER OF PREDICTIONS AND PERCENTAGE OF FULFILMENT IN EACH DISTRICT, FOR THE YEAR ENDED MARCH 31, 1909.

Month.	GULF.				MARITIME WEST.				MARITIME EAST.				TOTALS.			
	Verified.				Verified.				Verified.				Verified.			
	Number fully.	Number partly.	Number not.	Percentage.	Number fully.	Number partly.	Number not.	Percentage.	Number fully.	Number partly.	Number not.	Percentage.	Number fully.	Number partly.	Number not.	Percentage.
1908.																
April.....	121	165	14	92.6	128	100	14	83.6	128	107	9	87.1	1,318	1,094	131	88.0
May.....	100	73	12	79.0	99	80	11	86.4	99	82	9	87.4	1,150	873	144	82.2
June.....	123	83	37	82.5	121	100	20	90.9	121	96	23	88.8	1,274	1,012	213	87.8
July.....	124	101	18	88.7	123	102	18	90.2	123	96	22	87.0	1,366	1,145	175	90.2
August.....	118	97	20	90.7	118	88	21	83.5	118	90	21	85.1	1,317	1,062	211	88.6
September.....	118	87	27	85.2	117	92	23	88.5	117	90	19	85.0	1,326	1,077	201	88.8
October.....	130	100	19	84.2	132	97	29	84.5	132	97	27	83.7	1,389	1,072	217	85.0
November.....	110	93	9	88.6	115	98	9	89.1	115	94	15	88.3	1,278	1,056	141	88.1
December.....	127	103	13	86.2	138	99	22	79.7	138	89	33	76.4	1,400	1,085	235	88.9
1909.																
January.....	101	71	20	80.2	114	89	5	86.8	114	89	21	87.3	1,189	916	207	85.7
February.....	98	84	13	92.3	104	84	17	88.9	104	84	17	88.9	1,130	926	175	89.7
March.....	109	83	22	86.2	116	96	16	89.6	117	93	19	87.7	1,211	982	184	88.7
Totals.....	1,379	1,080	224	86.5	1,425	1,125	80	86.7	1,426	1,107	235	85.9	15,348	12,300	2,234	87.4

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During the past few months at the request of the government of Newfoundland arrangements have been completed whereby that colony will shortly receive storm warnings and forecasts from the central office of the Canadian service, special bi-daily bulletins being issued daily to that colony by telegraph from Toronto to a distributing agent in St. Johns.

Last summer a full meteorological equipment was furnished to each of six stations between the Athabaska river and the Arctic sea, namely, Fort McMurray, Hay river, Fort Norman, Fort Good Hope, Fort Simpson and Fort Macpherson, and from reports received recently by winter mail from the north it is evident that these outlying posts will furnish most valuable data not only as regards the path of storms across America, but also as regards the mean distribution of pressure in high latitudes.

The publications issued have been a daily weather map; a monthly weather map; the monthly Weather Review and an annual climatological report, which latter is a volume of 633 pages and represents an enormous amount of computation in the central office.

Reports and exchanges have been received with regularity from the meteorological bureaus of all countries, but owing to the temporary removal of the meteorological office last year and the prospective removal to the new building during the present summer, our library arrangements are much disarranged and in a thoroughly unsatisfactory condition.

INSPECTION.

As many stations as possible were inspected during the year but many others again had to remain without the requisite inspection.

The director visited certain portions of the Dominion more especially in the interests of the time service at St. John and Halifax, also that of Quebec.

The assistant director installed the new pattern electrical wind gauges at desirable points in the western provinces and in British Columbia, also at Pelee island on Lake Erie and instructed the provincial officers for Saskatchewan and Alberta. At the commencement of the present year he was deputed to proceed to Newfoundland and inaugurate the meteorological service for the Newfoundland government.

Inspectors Allan and H. V. Payne visited stations in the Gulf of St. Lawrence and in Ontario respectively and Mr. W. E. Jackson was selected to accompany the *Arctic* on her long cruise to the far north.

SOLAR WORK.

Owing to the demolition of the old magnetic observatory at Toronto early last spring, the 6-inch equatorial telescope was dismounted and the daily record of solar disturbance as indicated by sun spots had to be discontinued. The instruments will shortly be again mounted and a much more systematic and closer study of solar disturbance by telescope and spectroscope will be commenced and carried on, together with measurements of solar radiation as registered by an Ångström pyrheliometer.

Investigation as to the more direct causes leading to variations in the character of corresponding seasons in different years, has led to a conviction that in order to obtain results the circulation of the atmosphere must be studied as a whole as there is strong indication of inter-relationship between the intensity and position of the extra-tropical belts of high pressure and the formation of anticyclones in high latitudes. It does not appear improbable that tropical barometric gradients may be the pulse which first responds to a varying solar radiation and reacts on pressure distribution.

The Milne seismographs at Victoria and Toronto have been kept in operation throughout the year, 55 disturbances being recorded by the former and 46 by the

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latter. The Calabrian quake was recorded by both instruments, the preliminary tremors arriving at Toronto two minutes earlier than at Victoria, while, however, the latter showed somewhat the larger movement. It is proposed to install very shortly improved open scale recorders for the seismographs, in place of the old pattern now in use, it having been shown by Dr. Milne that with the newer type of instruments, minute preliminary tremors are recorded which with the more slowly moving surface are frequently lost by halation. The seismograph in use by the Meteorological Service are of the type approved and adopted by the B.A.A.S. Committee of Seismology.

TIME SERVICE.

The time service in connection with the Meteorological Service has been maintained most satisfactorily and time balls have been dropped daily, except Sundays, during the season of navigation at Montreal, Quebec and Halifax; a time gun has been fired at Vancouver and the fire alarm bells struck at Toronto. A new time ball tower has been erected at Halifax.

At Toronto during the year ending March 31, 1909, 95 observations for time were made in the meridian with the transit instrument; of these 78 were stellar and 17 solar observations. The positions of the stars were as usual those given in the 'Berliner Jahrbuch.'

Preparations for the removal of the transit instrument—chronograph and clocks—to their new quarters in the transit and clock building adjoining the new observatory on Bloor street was made in December, 1908. The Sidereal clock was stopped on the 16th, dismantled, thoroughly overhauled, cleaned and placed in its new position on December 23, the mean time clock being kept in its old position until the sidereal clock had been mounted and brought to its normal rate.

The transit instrument was dismantled on December 18 and put on its new pier in the transit room adjoining the clock room the same day, and finally adjusted into position by the 29th. The mean time clock was then dismantled, cleaned and put on its pier in the same room with the sidereal clock.

Both these clocks are on separate brick piers on concrete foundations down to the clay and welled in from the surrounding soil and building.

The transit pier has been carefully put up, being a stone cylinder 19 inches in diameter and about 6 feet long, embedded in concrete foundation built several feet in the clay and welled similar to the clock piers. The transit instrument is bolted to an oval slate slab, $1\frac{1}{2}$ inches thick, placed on top of the pier.

The new transit and clock building has proved to be a great improvement upon the old building.

The 6-inch equatorial telescope was dismantled early in April, 1908, to allow the old tower to be pulled down. This instrument has been packed away awaiting the completion of the new tower in the new building on Bloor street.

The difference in latitude and longitude between the transit piers of the old and new observatories has been determined by triangulation, the new pier being 24.9 seconds north and 0.95 seconds west of the old pier, the new latitude and longitude being: Latitude, $43^{\circ} 40' 0.8''$ N.; longitude, 5 hrs., 17 mins., 35.60 secs. W.

A large amount of transit work has been done in the new position, the clocks being gradually brought into their normal rates. The time exchanges with Quebec, Montreal and St. John, N. B., have been continued, also the time given to the Agincourt observatory and generally when required. A new improved switch-board, with all the necessary electrical connections on the clock, has been installed, as has also the fire-alarm time signal.

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THE following Table shows the difference between the Times at Quebec, Montreal and St. John at the various time exchanges compared with that at Toronto. The sign + indicates that Toronto is slow of the other observatories.

Year.	Quebec.	Montreal.	St. John.
1908.	Seconds.	Seconds.	Seconds.
April 24.....	+0·21	+0·58	+0·15
May 22.....	-0·92	+0·77	-0·76
June 5.....	-1·26	-0·32	-1·07
" 19.....	-0·47	-0·30	.....
July 10.....	-0·92	-0·69	-0·39
" 24.....	-0·88	-0·62	-0·58
August 7.....	+0·40	-0·63	-0·32
" 21.....	-1·16	-0·52	-0·51
September 18.....	-1·15	-0·02	.....
October 16.....	-0·48	.....	+0·56
November 6.....	-1·06	.....	+1·28
1909.			
* March 13.....	+0·21	.....	+0·73

* Exchange from the new transit building. The Latitude and Longitude of the new transit pier is :—
Latitude 43° 40' 0·8" N.
Longitude 5h. 17m. 35s. 60 W.

All of which is respectfully submitted.

R. F. STUPART,
Director.

APPENDIX A.

METEOROLOGICAL SERVICE, ST. JOHN OBSERVATORY,
ST. JOHN, N.B., July 1909.

R. F. STUPART, F.R.S.C.,
Director, Meteorological Service,
Toronto, Ont.

SIR,—I have the honour to present my annual report on the St. John observatory for the fiscal year ending March 31, 1909.

Meteorological Service.—The usual meteorological observations, records and reports have been continued without interruption. The various eye-reading and self-registering instruments, including electric rainfall register and wind recording apparatus, are in excellent condition. No change has been made either in equipment or method of work. The interest taken by the general public in the information furnished from the observations and records continues. This is evidenced by the largely increased demand individually and from the press.

Weather Bulletin.—As heretofore the morning weather bulletin has been promptly issued each week day, upon receipt of the telegraphic report from Toronto. It is published by the afternoon papers, distributed through the mail and posted in public places. This information of weather conditions, along with the forecasts and warnings of dangerous storms, is a necessity to mariners, shippers of perishable goods, contractors and numerous other interests affected by weather changes. The warnings and forecasts frequently requested through telephone are received and answered at all hours.

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The morning forecasts are repeated to St. Martins. Storms warning messages are telephoned to St. Martins and Point Lepreau and signals displayed for use of mariners in those parts of the Bay of Fundy.

Time Service of the Maritime Provinces.—Observations of standard stars with the meridian telescope were made nearly every clear night and with the clock comparisons recorded on the chronograph as previously reported. The time balls at St. John and Halifax have been dropped each week day at 1 p.m., 60th meridian time, excepting at Halifax during the period of erecting new tower and improved apparatus. Daily signals have been sent automatically, direct from our transmitting clock over the Western Union wires, throughout the maritime provinces, for the two minutes ending at 10 a.m., and continue to be most useful to navigators, railways and the public generally. Practically all the time pieces in eastern Canada are regulated by the time of this observatory. At other times than 10 a.m., time signals are frequently asked for by telegraph and telephone, beats from the relay in connection with the transmitting clock being audible locally and through long distance telephones.

Wireless Time Signals.—The apparatus at Camperdown, N.S., Marconi Station, which automatically repeats our time signal from land line to wireless has been maintained in operation throughout the year. Navigators find this method of checking ships' chronometers at sea most practical and useful.

Clocks.—The standard sidereal clock Riefler, No. 94, is mounted in the basement clock room where it is run under constant pressure and temperature. It has been in use continuously throughout the year and gives most satisfactory results. The Kullberg sidereal clock is also mounted in the clock room on a separate pier. The mean time transmitting clock, the chronograph, electrical and other apparatus used in connection with the time service are in the office. The mean time master clock, used for hourly synchronizing clocks on circuit in different parts of the city, is also mounted in the office. There has been considerable extension of this service. Clocks have been installed in public, banking institutions, &c.

The electric clock, in charge of the manager of the Western Union office at Halifax, for use in connection with the time ball service there, was cleaned while the time ball was dismantled. This clock is synchronized daily from the observatory and automatically sends the signal to drop the ball at 1 p.m. It is fitted with a break circuit attachment for sending a return signal to St. John and comparisons on our chronograph with standard rarely show an appreciable difference.

Halifax Time Ball.—In accordance with your instructions to arrange for the construction and installation of a new time ball for Halifax to replace the temporary apparatus which had been in operation since October 1, 1904, I at once proceeded with the plans and specifications for tower and machinery. Towards the end of April the temporary apparatus was dismantled and construction of new tower commenced. The ball, outside guides and machinery, were contracted for, constructed and set up by W. W. Howell & Company, of Halifax. The electric release was made by the Vaughn Electric Company, St. John and the tower built under contract by Walter Lownds of Halifax. The whole apparatus was finally completed on July 31, and put in operation on August 1. The time ball machinery was patterned after that for many years in use at St. John, it being more suitable to the climatic conditions prevailing during winter months than a ball moving on a staff which frequently failed, owing to sleet, snow or ice.

The ball is 3 feet 8 inches in diameter, constructed of 16-oz. copper, with a reinforcing band of copper $\frac{3}{4}$ -inch thick and 6 inches wide riveted and soldered around the centre. It is firmly attached to a piston head which drops into an iron cylinder of 15 inches internal diameter and 12 feet in length. When the ball is hoisted full elevation it is held by a brake. At the instant of 1 o'clock brake is electrically released and ball

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drops rapidly at first, then gradually settles down as the air compresses in bottom of cylinder, which is fitted with air valves to control the drop. During the past winter little or no trouble was experienced and the frequent failures of the old apparatus avoided.

I have the honour to be, sir,
Your obedient servant,

D. L. HUTCHINSON,
Director, St. John Observatory.

APPENDIX B.

QUEBEC, April 26, 1909.

The Director,
Meteorological Service,
Toronto.

SIR,—I have the honour to transmit my annual report for the fiscal year ending March 31, 1909.

All the meteorological observations have been taken three times daily as heretofore, and the bi-hourly temperatures continued at the Citadel.

Standard stars were observed on every fine night, and the correct time given to the city by means of the noon gun, and by telephone. The number of calls, which has increased constantly during the past few years, has reached the enormous number of nearly 8,000 in 1908, and on many occasions interfered with my daily work.

The time ball was dropped in a satisfactory manner during navigation season.

During my inspection in the month of November last, I found that certain repairs were necessary to keep the whole apparatus in good working order, and a special report was sent accordingly.

These repairs were made as authorized, before the opening of navigation this year.

All the meteorological instruments are in good order, but the sunshine recorder would require a new post, the old one being rotten.

The transit instrument is now rather old, and the foundations are not properly fixed to the ground. I often noticed considerable changes in deviation and inclination, especially at the beginning of winter and during the spring.

The equatorial telescope, which was purchased from Alvan Clarke, of Boston, in 1864, would require some repairs, but, before putting it in good order the tower should also be repaired and the old dome replaced, to protect the instrument.

The whole respectfully submitted.

ARTHUR SMITH,
Director.

APPENDIX No. 8.

HYDROGRAPHIC SURVEY.

OTTAWA, July 20, 1909.

SIR,—I have the honour to respectfully submit the following report upon the operations of the Hydrographic Survey for the fiscal year 1908-9.

During the period above mentioned the following parties were actively engaged in the field: on the great lakes, under Captain F. Anderson; on the Atlantic coast, under Captain Irving Miles; on the Pacific coast, under Captain P. C. Musgrave; upon Lake of Two Mountains, under Mr. A. J. Pinet, and in Cumberland Basin, under Mr. Chas. McGreevy. The survey of the St. Lawrence river between Montreal and Quebec being completed, only such field work was performed as was found necessary to obtain information regarding recent changes or improvements.

Great Lakes: the steamer *Bayfield* under command of Captain F. Anderson, assisted by Messrs. A. G. Bachand, A. E. Humphrey and R. J. Fraser, left Owen Sound on May 10 and proceeded to Lake Superior to take up work in the eastern approaches to Nipigon bay, and continued there until August 1, when a move was made to carry on the triangulation and the traverse of the shore from Simmons harbour to Isacor point to obtain a more correct delineation than is shown on the existing charts. This was completed and the vessel laid up at Owen Sound on November 23.

The north shore of Lake Superior from Pigeon river (the boundary line between Canada and the United States) to the eastern entrance of Nipigon bay, with the exception of Nipigon and Black bays, has now been carefully and accurately surveyed and charted; that between Simmons harbour and Isacor point, a distance of fifty miles has been traversed and plotted in detail, but no sounding has been done off it. There still remain eighty miles between Wilson island and Simmons harbour and fifty miles between Isacor point and Cape Gargantua as well as Slate islands, Michipicoten and Caribou islands yet to be completed.

During the winter of 1908-9, the staff was employed in plotting the season's work and preparing it for the engraver.

I regret to report that upon June 23, the steamer ran upon a well known rock in the eastern channel into Nipigon bay and sustained damage to the extent of \$5,884.13. An investigation was held in Collingwood and the blame was found to rest upon the sailing master and he was discharged and replaced by Captain J. F. Lunan.

Atlantic Coast.—The steamer *La Canadienne* under command of Captain Irving Miles, assisted by Messrs. Chas. Savary, G. C. Venn and W. R. McGee, left Sorel on May 18, and took up the survey of the mouth of Saguenay river, and the St. Lawrence river, between Red island and Razade islands.

A large scale plan of the mouth of Saguenay river was undertaken and completed showing accurately the many shoals and banks obstructing the navigation of this important river. The general work of charting the St. Lawrence river was proceeded with and carried out as far as Razade islands on a scale of two inches to the nautical mile. No important discoveries were made, but with the greater accuracy of detail, the new chart of this important locality cannot fail to be of vast benefit to mariners.

Work is very much delayed in this locality by the strong tides which *La Canadienne* is unable to stem.

The staff was fully occupied during the winter of 1908-9, in plotting the season's work and in preparing sheets for the engraver, two of which will be issued before the spring of 1910.

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Pacific Coast.—On April 3, the party under command of Captain P. C. Musgrave, assisted by Messrs. H. D. Parizeau, and L. R. Davies left Victoria by passenger steamer for the Skeena river to take up quarters in camp at Inverness and continue the survey of the southern approach to Prince Rupert harbour and the mouth of Skeena river.

On May 11, Captain Musgrave left camp and returned to Victoria to take over and commission the new steamer *Lillooet*. This was done and the steamer left for her station on June 10. The camp party was moved on board and the survey of Chatham sound, east of Lucy and Rachel islands and from Tree Bluff to Island point, undertaken and completed. This will give two charts on scales of three inches to the nautical mile.

One important result of this survey has been the finding of a shoal head of eleven feet upon Alexandra patch where not less than ten fathoms was supposed to exist and nearly on a direct line between Brown passage and the Coast island range for entering Prince Rupert harbour.

On May 30, the staff was increased by the appointment of Mr. F. P. V. Cowley.

The steamer *Lillooet* is the first vessel constructed especially for the Canadian Hydrographic Survey. She was designed by Mr. R. L. Newman of Victoria, B.C., and built by the British Columbia Marine Railways Company, Limited, at Esquimalt, at a cost of \$150,000, is 170 feet long, 27 feet in breadth and 15 feet in depth, has a displacement of 760 tons, and she is fitted with twin screws driven by two engines of 800 horse-power, giving a speed of eleven knots per hour. She is equipped with the latest surveying devices and is found to be eminently suited for the service.

During the winter months this party took up offices in Victoria, B.C., for plotting work and preparing charts for the engraver.

Lake of Two Mountains.—On May 1, this party in charge of Mr. A. J. Pinet, assisted by Messrs. G. B. St. Pierre and Henri Ortiz, left Montreal and resumed operations on the lake using the yacht *Josephine* and a houseboat. Fair progress was made and it is hoped that the survey will be completed in 1909.

Cumberland Basin, N.S.—In May, 1908, a small party in charge of Mr. Chas. McGreevy, assisted by Messrs. Paul Jobin and E. Jodoin, was organized at Amherst, N.S., to undertake a survey of Cumberland basin with a view to supplying charts in more detail for vessels trading to Amherst, &c., on the high water. This method of surveying such waters is not highly satisfactory and it is hoped that when operations are extended a vessel may be available for a base.

This party likewise spent the winter months in the office at Ottawa plotting the season's notes and preparing for the engraver.

In the office, in addition, Mr. Amos assisted by Messrs. Henri Melancon, Fred. Delaute and O. Soulière, has been engaged in preparing a full report upon the operations of the various parties that were engaged in the survey of the St. Lawrence river between Montreal and Quebec, from 1896 to 1906, and the charts resulting from these various surveys.

Work upon the charts of Lake St. Francis has made some progress.

Charts Issued.—During the fiscal year the following charts were engraved and issued to the public: 'Lake St. Peter,' 'White Island to Orignaux Point,' 'Lake St. Louis' and 'Key Harbour, Georgian Bay.'

The following were photolithographed:—

- Chart No. 15. Cap Levrard to Ste. Emelie.
- " No. 16. Ste. Emelie to Deschambault.
- " No. 17. Portneuf to Cap Santé.
- " No. 18. St. Croix to St. Antoine.

The second edition of No. 8, Head of Lake St. Peter.

The second edition of No. 7A, Berthierville to Lake St. Peter.

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In connection with the St. Lawrence river charts, it was deemed advisable to prepare sailing directions covering the distance, Quebec to Kingston, and for this purpose the services of Captain J. G. Boulton, Retired Royal Navy, of Quebec, were secured to assist the officers in charge of the various branches affected.

Resignations.—At the close of the year the following officers resigned: Mr. Robert Bickerdike, Mr. A. E. Humphrey and Mr. W. R. McGee.

Appointments.—On January 26, Mr. T. L. Killen was appointed stenographer to the survey.

I am, sir, your obedient servant,

WM J. STEWART,
Hydrographer.

APPENDIX No. 9.

REPORT OF THE CHAIRMAN OF THE BOARD OF STEAMBOAT INSPECTION.

CHAIRMAN'S OFFICE, OTTAWA, June, 1909.

To the Acting Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to submit the annual report of the Steamboat Inspection Service for the fiscal year ending March 31, 1909.

It contains the work of the service during the time stated, giving the number of steamboats inspected in the several divisions and their gross tonnage, with the amount of dues collected from steamers employed in the carriage of passengers between Canadian ports but registered elsewhere than in Canada, and the amount of fees received for engineers' examinations.

At the port of Montreal in addition to the steamers inspected, the ships' tackle and hoisting gear used for loading and unloading the vessels to the number of 343 were also inspected by the steamboat inspectors.

NUMBER of steam vessels reported as known by the Inspectors of Steamboats in the Dominion for the year ending March 31, 1909, also the number of steamers inspected but not registered in the Dominion for the same date.

Division.	Number of Dominion Registered Steamers.	Gross Tonnage of Dominion Registered Steamers.	Number of Steamers Inspected but not Registered in the Dominion.	Gross Tonnage of Steamers Inspected but not Registered in the Dominion.
Toronto.....	365	85,722	46	54,907
Collingwood.....	172	75,990	17	29,257
Kingston.....	160	28,399	19	5,390
Montreal.....	206	22,161	16	43,479
Sorel.....	87	28,881		
Quebec.....	109	20,882	10	17,249
Nova Scotia.....	148	34,648	31	56,741
New Brunswick and Prince Edward Island.	156	19,884	8	13,104
Vancouver and Yukon.....	171	21,028	14	20,836
Victoria, B.C.....	149	50,610	22	40,631
Manitoba and Northwest Provinces.....	174	15,345	1	681
	1,897	403,550	184	282,275

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NUMBER of Dominion registered steam vessels inspected and their gross tonnage, with amount of fees collected on account of steamboat inspection during the year ended March 31, 1909.

Division.	Number of Dominion Registered Steamers Inspected.	Gross Tonnage of Dominion Registered Steamers Inspected.	Amount of fees Collected on Account of Steamboat Inspection.
			\$ cts.
Toronto.....	316	82,865	138 40
Collingwood.....	154	74,163	45 68
Kingston.....	150	28,040	
Montreal.....	177	15,058	30 40
Sorel.....	83	27,927	
Quebec.....	105	20,576	458 32
Nova Scotia.....	146	36,624	3,246 96
New Brunswick and Prince Edward Island.....	137	18,604	
Vancouver and Yukon.....	154	20,447	1,263 36
Victoria, B.C.....	144	46,022	729 92
Manitoba and Northwest Provinces.....	114	11,844	
Engineers' Certificates.....			2,014 50
Total.....	1,680	382,170	7,927 54

BOARD MEETINGS AND APPOINTMENT OF INSPECTORS.

Owing to Mr. Richardson retiring from the service as boiler and machinery inspector at Vancouver, Mr. Hugh G. Robinson of that place, having passed the necessary examination, assumed the duties on May 12, 1908, and was appointed to the position by Order in Council of June 2, 1908.

The work having rapidly increased in the British Columbia district it became imperative to increase the staff to meet the demands, and Mr. Wm. J. Callum of Victoria, who passed the required examination was appointed as a boiler and machinery inspector by Order in Council of June 2, 1908, with office located at Victoria, B.C.

In order to meet conditions arising owing to the passing of the Act 7-8 Edward VII, Chapter 65, an Act to amend the Canada Shipping Act, a meeting of a quorum of the Board of Steamboat Inspection was convened at Ottawa, December 1, for the purpose of revising the rules for the examination of engineers, which was adopted and approved by His Excellency the Governor in Council, the 21st day of December, 1908.

Prosecutions with penalties enforced for violation of Part VII. of the Canada Shipping Act, Steamboat Inspection.

On July 25, 1908, a complaint was received by the department, charging that the steamer *Aletha* of Kingston was being overloaded by carrying more passengers than that allowed by her certificate of inspection, and also for plying on a route with an excursion of passengers for which she was not permitted by her certificate of inspection.

The case came up for trial before the police magistrate at Belleville on September 14 and 22, when the captain was fined \$175, and costs, on the charge of the vessel plying on a route for which she was not licensed, a cheque for same being received by the department, October 14, 1908.

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CASUALTIES.

The following are the casualties reported from the several divisions as having occurred during the year ending March 31, 1909.

TORONTO DIVISION.

May 9, 1908.—The steamer *Brockville* of Montreal, while lying at the wharf at Toronto fitting out, preparatory to being placed in commission, with the fires partially banked, an 8-inch flue in starboard boiler collapsed, whereby four of the crew including the chief engineer were killed. On investigation, it was found the boiler had been shut off from all other connections, with no steam gauge connected to it, and the safety valves had been screwed down so as to render them useless, hence it was impossible to ascertain the pressure to which the flue was subjected which was the cause of the accident.

June 12, 1908.—The steamer *Wenonah*, of Toronto, was totally destroyed by fire on Cecebe lake—cause of fire unknown.

November 21, 1908.—The steamer *City of Mount Clemens*, of St. Catharines, collided with the United States steamer *Neilson* on Lake St. Clair and sank. She was raised and towed about four miles when she again sank east of the old channel at St. Clair flats where she is still lying.

January 16, 1909.—The steamer *Tecumseh* of Sarnia was totally destroyed by fire at Goderich, Ont., which started about 3 a.m., and is supposed to have originated from the kitchen range, which was in use by three people engaged in repairing the steamer and who were living on board, and barely escaped with their lives.

The following steamers stranded or ran aground, viz.:—May 28 and October 13, 1908, the ss. *F. B. Osler*, of Toronto. June 4, 1908, the *City of Montreal*, of Toronto. August 17, 1908, the ss. *Neepawah*, of Port Glasgow, G.B. November 17, 1908, steamer *Bickerdike*, of Ottawa. December 17, 1908, the ss. *Beaverton*, of Newcastle, G.B., all of which were released, placed in dock and thoroughly repaired.

COLLINGWOOD DIVISION.

June 14, 1908.—ss. *J. G. Gidley*, of St. Catharines, was totally destroyed by fire on the south side of Manitoulin island. Cause of fire unknown. No casualties.

October 15, 1908.—The tug *R. A. McLean*, of Sault Ste. Marie, caught fire at Sterling bay and became a total loss. Cause of fire unknown. No casualties.

October 24, 1908.—Steamer *Iroquois*, of Goderich, on her trip from Little Current to Cutler in a dense fog ran on a submerged rock, listed badly, then caught fire and is practically a total loss. Cause of fire is not definitely known. No casualties.

November 1, 1908.—The ss. *Telegram*, of Collingwood, on her trip from Owen Sound to Providence bay, ran ashore and filled with water, then listed and caught fire and was abandoned as a total loss. No casualties.

November 3, 1908.—The tug *W. E. Gladstone*, of Owen Sound, was blown ashore in Lion's Head harbour during a heavy gale and became a total loss. No casualties.

KINGSTON DIVISION.

July 22, 1908.—The ss. *Stranger*, of Port Hope, on a trip from Port Perry to Lindsay was destroyed by fire on Scugog lake. No fatalities occurred.

July 16, 1908.—The steam barge *Robert McDonald*, of Kingston, while plying on Lake Ontario from Peninsular point to Stoney point, was partially destroyed by fire. No fatalities.

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MONTREAL DIVISION.

July 9, 1908.—The steamer *Pontiac*, of Ottawa, 116 gross tons, while lying at the wharf at Arnprior, was totally destroyed by fire. No casualties. Cause of fire unknown.

November 10, 1908.—The ss. *Temiscamingue*, of Ottawa, 295 gross tons, while on her trip from New Liskard to Temiskaming, the furnace crown of her boiler, it being of the locomotive type, collapsed, whereby the two firemen and one deck hand were killed by the escaping steam and water; one passenger jumped overboard and was drowned and seven others were badly scalded, including the engineer.

An investigation as to the cause of the accident was held by the chairman of the Board of Steamboat Inspection, when it was clearly demonstrated it was due solely to low water.

QUEBEC DIVISION.

June 6, 1908.—The ss. *Lady Eileen*, of Gaspé, 526 gross tons, when on her trip from Campbellton, N.B., to Gaspé, ran ashore on the New Port island in a dense fog, becoming a total loss. No loss of life.

November 15, 1908.—ss. *King Edward*, while at anchor, was driven ashore by a severe gale of wind in the English bay, Anticosti island. No fatalities.

November 26, 1908.—The passenger steamer *Otranto*, of Quebec, stranded at Bonaventure, becoming a total loss. No casualties.

November, 1908.—Steamer *Rodolphe*, of Montreal, was destroyed by fire at the wharf in Sorel harbour and sank. The cause of fire is unknown. No lives lost. The machinery was taken out of her.

March, 1908.—Steamer *Dream*, of Quebec, was destroyed by ice at Grandes Piles. Machinery was taken out.

NOVA SCOTIA DIVISION.

Casualty returns nil.

NEW BRUNSWICK AND PRINCE EDWARD ISLAND DIVISION.

June 17, 1908.—Steamer *Aberdeen*, of St. John, N.B., caught fire at her moorings, Cole's island, Washademoak lake, and was totally destroyed. No loss of life. Cause of fire unaccounted for.

July 9, 1908, ss. *Arcola* of St. John, N.B., when on a voyage from Great Britain to Chatham, N.B., was wrecked at St. Paul's Island, on the coast of Cape Breton, becoming a total loss. No loss of life.

November, 1908. The ss. *Calluna* of Richibucto, N.B., when on a voyage from Richibucto to St. John, N.B., got lost on Pictou Island and became a total wreck. No casualties.

MANITOBA AND NORTHWEST PROVINCES DIVISION.

June 7, 1908. The steamer *City of Medicine Hat* while on her trip down the Saskatchewan river at Saskatoon, came in contact with telegraph and other wires which too late to go back on account of the strong current, whereby some of the wires getting into the boat's rudder the control of her was lost, and she was carried broadside against a pier of the bridge and broke in two, becoming a total loss. No fatalities.

August 14, 1908. Steamer *La Rien* of Winnipeg, while lying at anchor on the Red river at Winnipeg, caught fire and was totally destroyed. No person being on board at the time. Cause of fire unknown.

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August 6, 1908. The steamer *Premier* of Winnipeg, 414 gross tons, while lying at her dock on Lake Winnipeg between one and two a.m., caught fire and was totally destroyed. Three of the crew and five passengers were burned in their staterooms. An investigation was held by Commander Spain, but failed to locate the cause of the fire as supposed to have originated about the boiler.

BRITISH COLUMBIA AND YUKON DIVISION.

The following steamers stranded or ran aground:—On April 23, 1908, ss. *Hope* of Victoria, April 25; ss. *Vadso* of Victoria, October 26; ss. *Iroquois*, November 17; ss. *Owen*, December 5; ss. *Hope* of Victoria. The following steamers were damaged through collision:—September 19, 1908, steamers *Amur* and *Vadso*, of Victoria, November 8, 1908, steamer *Princess Royal*, December 3, 1908; ss. *Charmer*, all of which were repaired, made seaworthy and placed again in commission.

The following steamers stranded and became a total loss:—August 8, 1908, tug *Albatross*, of Victoria; October 15, steamer *Caledonia*, of Victoria; January 12, 1909, steamer *Favorite*, and January 10, 1909, *John P. Douglass*, both of which were caught in ice and destroyed. March 18, 1909, tug *Daisy*, of Victoria, grounded on a reef and slid off into deep water, a total loss.

May 6, 1908. SS. *Otter* of Victoria, on a voyage from Kyuquot to Victoria broke the tail shaft of the engine. She was picked up by steamer *Tees* and towed to Victoria, where a new one was fitted.

March 27, 1909. The gasoline passenger launch *Ariadne*, of Vancouver, caught fire burning to the waters edge, afterwards sinking, a total loss.

January 25, 1909. SS. *Venture* of Victoria, when loading at Inverness, Skeena river, at 2.30 a.m., caught fire, supposed over boilers, and was burned to the water's edge. Hull a total loss.

I am, sir,

Your obedient servant,

E. ADAMS,
Chairman Board of Steamboat Inspection.

APPENDIX 10.

STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of Canada.

PRINCE EDWARD ISLAND.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Alberton Range	William Champion	Oct. 25, 1907	130 00
Block House	A. S. McNeil	Mar. 25, 1901	385 00
Brush Wharf	D. W. McPherson	Jan. 13, 1899	80 00
Crapaud, Outer	Abner J. Howatt	July 22, 1893	130 00
" Inner	James Inman	Aug. 13, 1901	120 00
Cardigan River	John W. Morrison	" 15, 1901	100 00
Cape Bear	Luther Jordan	Apr. 12, 1905	400 00
Cape Egmont	Jos. J. D. Gallant	Oct. 21, 1902	270 00
Cape Tryon	William Bell	Mar. 17, 1905	270 00
Cove Head Range	John A. Kielly	Nov. 27, 1890	90 00
Darnley Range	Geo. W. Wiggins	Oct. 16, 1896	150 00
Darnley basin	Chas. Taylor	June 14, 1897	75 00
East Point	L. R. J. McDonald	Jan. 18, 1901	760 00
Fish Island	Patrick Gould	Dec. 7, 1906	270 00
Georgetown, Inner	Jesse G. Clark	Aug. 14, 1901	150 00
Georgetown Railway Wharf	John Westaway	Jan. 16, 1906	130 00
Grand River, East Lot 56	Alfred Robertson	Oct. 5, 1898	130 00
Grand Tracadie	J. W. McDonald	May 24, 1901	130 00
Hazard, Inner Range	Angus Beaton	Nov. 21, 1902	75 00
" Outer Range	Daniel McRae	Apr. 6, 1900	80 00
Indian Point	J. S. Allen	May 18, 1898	400 00
Little Channel	William Hardy	" 26, 1875	130 00
Murray Harbour, Inner	Robert Penny	Nov. 11, 1897	70 00
" Outer	Lemuel McLeod	Dec. 21, 1897	70 00
Miminegash, Inner	Elijah Costain	May 18, 1906	70 00
" Outer	Patrick O'Brien	" 14, 1897	75 00
New London	James H. McLeod	Jan. 29, 1896	150 00
North Cape	James Phee	Sept. 4, 1897	345 00
North Rustico	Jos. N. Pino	Feb. 6, 1897	150 00
Orwell	John McDonald	June 25, 1879	80 00
Point Prim	Donald Gillis	Dec. 10, 1897	300 00
Panmure Island	Colin Steele	June 3, 1901	380 00
" F. A.	Mathias Condon	" "	380 00
Sandy Island, (Cascumpec)	Jas. C. Tuplin	May 5, 1897	345 00
Savage Harbour	Jas. A. McDonald	July 11, 1889	130 00
Sea Cow Head	M. P. O'Roneghan	Apr. 21, 1873	330 00
Souris, East	John D. Lavie	June 23, 1905	395 00
Summerside Wharf	John Fraser	Apr. 12, 1897	130 00
Summerside Range	George Stavart	Sept. 8, 1895	95 00
St. Andrew's Point	George Connor	June 3, 1901	150 00
St. Peter's Island	James W. Taylor	May 1, 1897	240 00
St. Peter's Harbour	Albert Anderson	July 25, 1900	150 00
Tignish Run	Agapè Gaudet	Aug. 30, 1897	150 00
Warren Farm Range	A. S. McNeil	May 16, 1907	100 00
West Point	William McDonald	Jan. 22, 1876	345 00
Wood Island	Roderick W. McKay	Apr. 11, 1899	295 00
Wood Island Range	James Young	Nov. 14, 1902	95 00
Wright's Range	Charles Wright	June 14, 1894	130 00

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STATEMENT giving Names of Stations and Lightkeepers, &c.—*Continued.*

NOVA SCOTIA.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Abbott's Harbour Pole.....	W. H. D'Entremont.....	May 22, 1888..	100 00
Advocate Harbour.....	John H. Morris.....	Aug. 10, 1904..	300 00
Amet Island.....	Lloyd Rogers.....	Nov. 11, 1902..	460 00
Amherst Harbour Range.....	William Shea.....	May 21, 1908..	180 00
Annapolis.....	Jos. McMillan.....	Mar. 1, 1908..	100 00
Apple River Light and Fog Alarm.....	Hill E. Elderkin.....	" 31, 1905..	800 00
Argyle.....	Chas. A. Amiro.....	Feb. 6, 1893..	460 00
Arichat.....	Capt. Wm. Lavashe.....	Oct. 17, 1898..	320 00
Arisaig.....	Hugh R. McAdam.....	Nov. 14, 1898..	130 00
Baccaro.....	Wm. L. Smith.....	Janv. 9, 1907..	485 00
Barrington Lightship.....	Capt. Jno. H. Lyons.....	June 18, 1897..	800 00
Battery Point.....	Henry Naas.....	Mar. 12, 1897..	370 00
Bear River.....	Wm. Hunt.....	Apr. 10, 1905..	180 00
Beaver Harbour.....	L. G. Cameron.....	Feb. 15, 1902..	150 00
Bear Island.....	Michael O'Brien.....	Dec. 7, 1906..	300 00
Beaver Island.....	W. E. O'Leary.....	Feb. 22, 1900..	460 00
Belliveau Cove.....	J. H. Belliveau.....	" 16, 1889..	95 00
Betty Island.....	P. E. Christian.....	June 29, 1904..	580 00
Bird Island.....	H. C. McKay.....	May 21, 1901..	460 00
Black Rock.....	Chas. Robinson.....	Mar. 16, 1885..	360 00
Black Rock Point.....	M. D. Morrison.....	June 8, 1892..	295 00
Boar's Head.....	F. Ruggles.....	May 24, 1901..	395 00
Bass River.....	David Vance.....	Oct. 24, 1907..	100 00
Bon Portage.....	Angus Greenwood.....	Jan. 14, 1907..	420 00
Briar Island Light.....	J. N. Peters.....	June 6, 1901..	460 00
Briar Island Fog Alarm.....	B. H. Morrell.....	" 6, 1901..	460 00
Brooklin Pier Pole.....	F. T. Gardner.....	Feb. 6, 1885..	100 00
Bunker's Island.....	F. H. Doane.....	July 27, 1904..	395 00
" North End.....	Jas. H. Schoville.....	Jan. 16, 1907..	240 00
Budget.....	Freeman Pride.....	Dec. 7, 1905..	240 00
Burnt Coat.....	Wm. Y. Falkner.....	June 22, 1898..	295 00
Bourgeois Inlet.....	Marian Burke.....	Dec. 1, 1902..	75 00
Campbell's Island.....	John A. McDonald.....	Feb. 16, 1907..	140 00
Candlebox Island.....	Benjamin Leblanc.....	Nov. 1, 1892..	370 00
Canso Harbour and False Passage.....	Joseph Long.....	Dec. 31, 1896..	370 00
Canso Harbour Range.....	Wm. J. Mathews.....	Dec. 17, 1904..	240 00
Cape D'Or Fog Alarm.....	F. H. P. Dewis.....	Apr. 13, 1898..	800 00
Cape Fourchu Light and Fog Alarm.....	T. S. Doane.....	Dec. 31, 1904..	920 00
Cape George.....	John Murray.....	Nov. 3, 1882..	265 00
Cape La Ronde.....	John J. Mauger.....	" 16, 1898..	370 00
Cape North.....	Norman McLeod.....	Oct. 14, 1899..	400 00
Cape Rosebay Light and Fog Alarm.....	John L. McKenna.....	Mar. 31, 1899..	920 00
Cape Sable.....	Arthur Cunningham.....	July 16, 1902..	920 00
Cape Race.....	John Myrick.....	" 1, 1900..	1,950 00
Cape St. George.....	Alex. L. McEachern.....	Sept. 8, 1898..	510 00
Cape St. Lawrence.....	Chas. Jamieson.....	" 21, 1893..	460 00
Cape St. Mary's.....	Benj. H. Robichau.....	July 5, 1886..	395 00
Cape Sharpe.....	Freeman Yorke.....	June 30, 1902..	800 00
Canning River, Inner.....	Fred Clarke.....	Apr. 29, 1902..	100 00
" Outer.....	Fred W. Bishop.....	" 29, 1904..	130 00
Cariboo Island.....	D. Falconer.....	Dec. 20, 1902..	370 00
Carter's Island.....	Robert McDonald.....	Jan. 4, 1886..	325 00
Caveau Point Range.....	Germain Chiasson.....	Aug. 20, 1897..	180 00
Charlo Cove Light.....	Stephen C. Richard.....	Nov. 4, 1901..	170 00
Chebueto Head Light and Fog Alarm.....	Capt. Richard Holland.....	Oct. 1, 1906..	920 00
Chester Ironbound.....	Uriah Young.....	Feb. 15, 1884..	460 00
Cheticamp.....	Marcelin Muise.....	Nov. 27, 1896..	345 00
Cheticamp Range.....	Philip Burgeois.....	May 23, 1898..	180 00
Church Point.....	J. H. Saulnier.....	Aug. 8, 1878..	200 00
Clarke's Cove.....	Roderick McDonald.....	Apr. 2, 1904..	130 00
Coffin's Island.....	Chas. M. Firth.....	June 30, 1880..	460 00

STATEMENT giving Names of Stations and Lightkeepers, &c.—*Continued.*NOVA SCOTIA—*Continued.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Coldspring Head.....	L. Brownell.....	March 27, 1901	150 00
Cole Harbour.....	Wm. M. Munro.....	April 23, 1907	70 00
Cole Harbour Range.....	Géo. C. Jamieson.....	Oct. 21, 1898..	180 00
Country Harbour.....	Henry Burke.....	June 11, 1902..	460 00
Cranberry Island Light and Fog alarm.....	James P. Hanlon.....	April 10, 1905..	920 00
Creighton's Head.....	H. H. Creighton.....	May 6, 1874..	240 00
Cross Island Light and Fog alarm.....	W. H. Wynacht.....	April 13, 1893..	920 00
Croucher's Island.....	Géo. Croucher.....	Jan. 31, 1883..	345 00
Crotch.....	C. J. O. Hanley.....	May 6, 1906..	200 00
Dartmouth.....	Wm. Patterson.....	June 3, 1903..	130 00
Devil's Island.....	W. G. Fulker.....	May 3, 1886..	490 00
Digby Pier Pole.....	Edwin Beaman.....	" 29, 1897..	100 00
Dover Harbour.....	Edward Morash.....	Oct. 1, 1906..	240 00
Duffus Point, inner.....	Alex. Fraser.....	Jan. 13, 1903..	130 00
" outer.....	M. McLean.....	" 13, 1903..	125 00
Economy Pole.....	Ingersoll L. McLellan.....	May 16, 1899..	60 00
Egg Island.....	Jos. B. Stoddard.....	" 6, 1907..	555 00
Eddy Point.....	Edward Mundell.....	July 28, 1903..	485 00
Fish Island, Tusket River.....	Séverin LeBlanc.....	" 1, 1899..	295 00
Flint Island.....	Michael Brean.....	Aug. 20, 1904..	460 00
Fourche Head, Light.....	Albert Hooper.....	May 18, 1908..	150 00
Fort Point.....	J. E. Misener.....	" 16, 1896..	205 00
Freestone Island.....	Michael Sampson.....	" 11, 1907..	180 00
Fisherman's Harbour.....	Théodore Beiswanger.....	Dec. 8, 1905..	180 00
Gabarouse.....	Jas. McDonald.....	Nov. 22, 1890..	180 00
Gilbert Point.....	Jos. W. Melanson.....	Aug. 18, 1894..	300 00
George's Island Light and Fog Bell.....	Robt. Ross.....	Jan. 18, 1876..	320 00
Gillies Point.....	Hector McLean (M's. son).....	Dec. 18, 1897..	180 00
Glasgow Point.....	Abram Clory.....	July 25, 1894..	180 00
Grandique.....	Daniel Clough.....	July 4, 1884..	75 00
Grandique.....	D. A. Kaulback.....	" 19, 1907..	60 00
Grand Etang.....	Séverin B. LeBlanc.....	Mar. 25, 1905..	75 00
Grand Passage, Briar Island.....	Chas. Buckmen.....	Jan. 7, 1901..	295 00
Green Cove.....	A. J. Sallow.....	Dec. 28, 1900..	205 00
Granville Centre.....	Henry Rooney.....	Feb. 24, 1904..	90 00
Green Island.....	Wm. A. Duann.....	May 12, 1903..	530 00
Gull Rock.....	L. D. Orchard.....	Jan. 1, 1877..	485 00
Guyon Island.....	James W. Hardy.....	" 30, 1903..	490 00
Glace Bay Range.....	Michael McNeil.....	Nov. 19, 1907..	75 00
" ".....	Angus McFarlane.....	" 19, 1907..	90 00
Guysboro.....	Moses C. Scott.....	April 19, 1884..	300 00
Harbour au Bouche.....	Capt. Patrick Webb.....	Feb. 19, 1896..	295 00
Hawke Island.....	Bartholomew Boudrot.....	Dec. 7, 1904..	265 00
Herring Cove.....	Wm. Brackett.....	Aug. 28, 1897..	130 00
Henry Island.....	D. A. McLennan.....	" 1, 1907..	460 00
Highland Village.....	W. A. Hennessy.....	May 6, 1905..	60 00
Hobson's Island.....	John D. Smeltzer.....	April 10, 1900..	345 00
Horton Bluff.....	Mrs. S. M. Rathburn.....	Sept. 3, 1879..	295 00
Hubbards Cove.....	Albert S. Coolin.....	Oct. 31, 1903..	295 00
Harbour Island.....	Chas. G. Hodgson.....	June 16, 1908..	330 00
Indian Harbour.....	Henry Boutilier.....	" 6, 1901..	180 00
Ingonish.....	Robt. F. Warren.....	Sept. 17, 1903..	400 00
" Harbour.....	Matthew Hawley.....	May 13, 1897..	170 00
Ironbound Island.....	Howard M. Wolf.....	June 22, 1895..	355 00
Isaac's Harbour.....	Ira L. Griffin.....	April 28, 1894..	265 00
Isle au Haute.....	Percy E. Morris.....	Aug. 2, 1904..	530 00
Iona.....	F. X. S. McNeil.....	Nov. 16, 1901..	130 00
Jeddore Rock.....	John W. Mitchell.....	Sept. 29, 1882..	460 00
Jeddore Harbour Range.....	Jeremiah Harpell, jr.....	Jan. 21, 1901..	240 00
Jerome Point.....	Kenneth McAskill.....	July 30, 1901..	320 00
Jerseyman's Island.....	Alphonse Thériault.....	" 1, 1905..	370 00
Jordan Bay.....	John Frederick.....	Dec. 19, 1906..	130 00
Kidstone's Island.....	Donald McRae.....	May 17, 1892..	240 00

SESSIONAL PAPER No. 21

STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of Canada.

NOVA SCOTIA—Continued.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Kingsport.....	C. H. Huntley.....	June 30, 1890..	100 00
Ketch Harbour.....	Chas. Martin.....	May 19, 1905..	95 00
Lahave.....	W. H. Palmer.....	" 22, 1878..	240 00
Lingan Head.....	John Walsh.....	July 4, 1904..	240 00
Liscomb.....	James S. Hemlow.....	Jan. 2, 1908..	370 00
Little Dyke.....	S. Stewart.....	May 1, 1906..	60 00
Little Hope.....	Capt. Almon Doggett.....	Oct. 22, 1901..	680 00
Little Loraine, Harbour.....	Patrick Gallant.....	Jan. 19, 1900..	120 00
Little Narrows.....	Alex. W. Ross.....	May 23, 1902..	150 00
Louisbourg.....	Philip Price.....	Nov. 8, 1897..	350 00
Louisbourg Harbour Range.....	Thomas Connington.....	Oct. 6, 1897..	240 00
Louisbourg Fog Alarm.....	D. A. Campbell.....	March 20, 1902..	920 00
Low Point.....	John C. Peters.....	Oct. 1, 1865..	460 00
Low Point Fog Alarm.....	Thos. O'Neil.....	May 2, 1904..	500 00
Mabou Outer.....	E. Doyle.....	June 14, 1897..	80 00
" Inner.....	Roderick McLean.....	Dec. 7, 1906..	70 00
Main à Dieu.....	John Pope.....	Sept. 11, 1902..	370 00
Margaree.....	John A. McRae.....	Feb. 28, 1907..	460 00
Margaree, Harbour Inner.....	R. McLellan.....	June 8, 1901..	70 00
" Outer.....	Miles A. Dunn.....	May 12, 1903..	70 00
Margaret's Bay.....	M. B. Pearl.....	Sept. 1, 1908..	510 00
Margaretsville.....	Mrs. Ruth Early.....	Feb. 19, 1887..	240 00
Marie Joseph.....	David Turner.....	Jan. 6, 1905..	285 00
Marjories, Island.....	Norman McDonald.....	July 4, 1884..	130 00
Masstown Pole.....	G. W. Vance.....	June 29, 1898..	60 00
Mauger's Beach Light and Front Light.....	Wm. Iceton, sen.....	July 6, 1903..	800 00
Meteghan.....	L. C. Comeau.....	Oct. 12, 1875..	130 00
Mitcheners Point.....	William Currie.....		150 00
Moser's Island.....	Samuel Moser.....	Nov. 6, 1885..	360 00
Mullin's Point.....	James Mullins.....	June 8, 1892..	240 00
Munro Point.....	Malcolm Buchanan.....	Oct. 25, 1905..	150 00
McKenzie's Point.....	Hector McRae.....	Aug. 20, 1890..	180 00
	(John Kent.....	Apr. 29, 1904..	100 00
Musquodoboit Harbour Range 'B'.....	(Fred. Kent, assistant.....	Mar. 11, 1908..	50 00
" " 'F'.....	Jeremiah Kent.....	Apr. 29, 1904..	125 00
McNeil's Beach.....	Lauchlin McNeil.....	Aug. 6, 1884..	75 00
McMillan's Point.....	John B. Chisholm.....	Dec. 2, 1905..	205 00
McNab's Island.....	Mathew Lynch.....	June 23, 1905..	360 00
Negro Harbour Range.....	Levi Perry.....	" 17, 1899..	250 00
Negro Island.....	Byron Nickerson.....	July 26, 1897..	370 00
Neil Harbour.....	A. A. Buchanan.....	Aug. 14, 1899..	180 00
North Canso.....	Robie McKay.....	Feb. 4, 1882..	360 00
Noel.....	Geo. C. Davidson.....	Apr. 25, 1906..	112 50
Ouitique Island.....	Fred. A. Burke.....	Feb. 16, 1907..	420 00
Page Island.....	Alfred M. Powell.....	Dec. 5, 1905..	265 00
Parrsboro'.....	William Pettis.....	" 6, 1888..	400 00
Pease Island.....	Thos. Baker.....	May 19, 1879..	420 00
Peggy's Point.....	Sydney H. Garrison.....	Dec. 22, 1902..	395 00
Pennant.....	P. A. Gray.....	June 30, 1903..	130 00
Petite de Grat.....	E. Landry.....	Feb. 23, 1897..	240 00
Pictou Bar.....	Wm. Munro.....	Nov. 22, 1890..	460 00
Pictou Custom House.....	Chas. Bone.....	June 14, 1907..	100 00
Pictou Island.....	Andrew McFarlane.....	" 8, 1892..	460 00
Pictou Island Pier, West end.....	Chas. D. Patterson.....	Mar. 29, 1905..	460 00
".....	Hugh McLean.....	June 24, 1905..	100 00
Pictou Harbour Range.....	David Lowden.....	July 12, 1897..	210 00
Piper's Cove.....	John C. McNeil.....	Dec. 18, 1897..	150 00
Pointe Aconi.....	John Charles Bonner.....	Nov. 6, 1903..	240 00
Point Edward Front.....	J. B. Rudderham.....	Jan. 15, 1905..	295 00
" Back.....	A. J. Lewis.....	May 22, 1905..	180 00
Pointe Prim Light, Fog Alarm, Digby.....	W. E. Ellis.....	Mar. 8, 1875..	920 00
Pointe Tupper.....	Duncan Gillis.....	Apr. 1, 1906..	345 00
Pomquette Island.....	M. Murphy.....	Dec. 18, 1890..	395 00

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STATEMENT giving Names of Stations and Lightkeepers, &c.—Continued.

NOVA SCOTIA—Concluded.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Port au Pique.....	Sam Creelman.....	May 2, 1901..	60 00
Port Bickerton.....	Theodore O'Hara.....	Jan. 26, 1901..	205 00
Port Felix.....	W. C. Boudrot.....	July 16, 1902..	295 00
Port George.....	Geo. M. Foster.....	Nov. 19, 1897..	130 00
Port Greville Range.....	Ernest A. Hatfield.....	June 29, 1903..	225 00
Pope's Harbour.....	Jas. Bollong.....	Aug. 6, 1877..	345 00
Port Hood.....	J. Allan McDonald.....	May 10, 1890..	300 00
Port Hubert.....	Watson Burgess.....	July 26, 1892..	180 00
Port Mouton.....	J. Oscar Campbell.....	April 29, 1898..	370 00
Port Medway.....	Kenneth D. Foster.....	Oct. 13, 1892..	300 00
Port Medway Harbour.....	Samuel T. Foster.....	Feb. 17, 1899..	100 00
Port Lorne.....	George D. Corbett.....	May 31, 1904..	300 00
Port Wade.....	Chas. Slocum.....	Feb. 1909..	50 00
Pubnico.....	Geo. D. Amero.....	Feb. 6, 1893..	355 00
Pugwash.....	Murdock McLeod.....	Dec. 10, 1897..	345 00
Queensport.....	W. E. Ehler.....	Aug. 13, 1906..	345 00
Quaker's Islands.....	Wm. A. Mitchell.....	Feb. 19, 1896..	245 00
Red Island.....	John P. Campbell.....	Nov. 30, 1901..	130 00
*Sable Island Humane Station.....	R. J. Boutillier, supt.....		700 00
St. Ann's.....	Alex. Nicholson.....	June 5, 1905..	170 00
†St. Paul's Island.....	John M. Campbell, supt.....		700 00
St. Esprit.....	Alex. W. Finlayson.....	April 12, 1905..	490 00
St. Paul's Island, West Point.....	John McKenzie.....		400 00
St. Paul's Island Fog Alarm.....	M. J. McLeod.....	July 10, 1906..	500 00
St. Paul's Island, N. E. Point.....	John Rose.....		400 00
Salter's Head.....	Callo Smith.....	June 21, 1888..	75 00
Sambro Light and Fog Alarm.....	Alfred Gilkie.....	Jan. 8, 1867..	800 00
Sambro Harbour Light.....	John H. Findlay.....	Dec. 7, 1899..	130 00
Sambro Inner Island Light.....	Ephraim Smith.....	Jan. 3, 1900..	130 00
Scattarie Light and Fog Alarm.....	John T. Martell.....	July 30, 1897..	1,200 00
Seal Island Light and Fog Alarm.....	John Crowell.....	Oct. 14, 1899..	920 00
Seal Island.....	Simon Joyce.....	July 4, 1884..	180 00
Shafner's Point.....	Jacob V. Roblee.....	May 29, 1897..	180 00
Sheet Rock.....	D. A. McCarthy.....	Jan. 1, 1906..	530 00
Sheet Harbour Passage.....	James Wambolt.....	May 11, 1887..	70 00
Sand Spit (Shelburne Harbour).....	Jas. G. Stephens.....	Mar. 11, 1903..	325 00
Ship Harbour.....	Howard Palmer.....		295 00
Shule Harbour.....	Capt. Clifford Patterson.....	Oct. 26, 1905..	200 00
Sissiboo.....	Jas. Amirault.....	July 11, 1899..	240 00
S. E. Beaver Island.....	Theodore Sampson.....	Oct. 13, 1892..	95 00
Spencer's Island.....	Baxter McLellan.....	July 21, 1904..	130 00
Spencer's Point.....	R. A. Spencer.....	April 1, 1870..	130 00
Stoddart's Harbour.....	Ephraim Larkin.....	Mar. 18, 1806..	265 00
Sydney Bar.....	George Nunn.....	June 20, 1872..	345 00
Terrence Bay.....	Samuel P. Slaunwhite.....	Oct. 13, 1903..	130 00
Three Top Island.....	W. L. Munroe.....	" 28, 1879..	360 00
Tor Bay.....	Jas. M. Webber.....	May 10, 1898..	345 00
Troop Point.....	Ralph Troop.....	Jan. 23, 1906..	120 00
Victoria Beach.....	James Hinds.....	Mar. 7, 1901..	130 00
Wallace Harbour.....	George Boyle.....	July 13, 1903..	180 00
Walton Harbour.....	Lewis E. Burgess.....	" 13, 1903..	180 00
Wedge Island.....	Wm. R. Church.....	Mar. 27, 1907..	515 00
West Head Barrington.....	Wm. B. Smith, jun.....	April 12, 1890..	240 00
West Arichat Range, Front Station.....	Edward Delory.....	Sept. 1, 1904..	100 00
" " Back Station.....	Michael Gerrior.....	" 1, 1904..	100 00
Westhaver's Island.....	Alfred Strum.....	" 25, 1888..	240 00
Westport.....	E. W. Sutherland.....	April 12, 1890..	420 00
Whitehead.....	Capt. Jas. Wells.....	Oct. 20, 1897..	555 00
Whycocomah.....	Murdock Matheson.....	Sept. 11, 1884..	75 00
Wood's Harbour.....	Jas. E. Goo in.....	Aug. 27, 1900..	265 00
Wolfville.....	J. L. Franklin.....	April 4, 1902..	130 00
Wolf Point.....	Howard Palmer.....	Oct. 14, 1899..	250 00
Yarmouth Harbour (see Bunker Island).			

*With board for self, family and assistants and allowance for salaries of staff.

† With 5 boatmen at

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STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of Canada.—*Continued.*

NEW BRUNSWICK.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Anderson's Hollow Light.....	Aron B. Copp.....	Mar. 30, 1903..	130 00
Beaver Harbour.....	J. Melvin Eldridge.....	May 2, 1904..	320 00
Beacon (St. John Harbour).....	Wilson Gregg.....	Nov. 4, 1901..	445 00
Bliss Island.....	James H. McLeod.....	Oct. 17, 1900..	465 00
Bathurst.....	Geo. C. Sutherland.....	Mar. 20, 1882..	240 00
Belyea's Point.....	Mrs. Westfield A. Day.....	Nov. 21, 1906..	100 00
Baie du Vin.....	James Chapman.....	July 24, 1882..	240 00
Buctouche Beacon.....	H. B. Robicheaud.....	June 21, 1884..	180 00
" Bar.....	Jadus P. Cormier.....	July 26, 1902..	240 00
Big Duck Island Fog Alarm.....	Rupert Burnham.....	June 25, 1906..	670 00
Bridge's Point Light.....	Robert Upton.....	Sept. 11, 1899..	95 00
Belle Isle (Hatfield's Landing).....	Thos. W. Spragg.....	June 27, 1903..	95 00
Bellony Point.....	Edward H. Egan.....	May 17, 1902..	140 00
Black Lands Gully.....	Urbain Daigle.....	" 28, 1903..	130 00
Cape Enrage Fog Alarm and Light.....	James G. Barbour.....	" 11, 1888..	800 00
Cape Jourimam.....	A. J. P. Bent.....	Jan. 26, 1901..	345 00
Cape Tormentine.....	J. R. Barry.....	Mar. 26, 1906..	150 00
Caraquet.....	G. Laintaigne.....	June 16, 1888..	240 00
" Lower Light.....	Frederic F. Doucet, jr.....	Oct. 14, 1903..	70 00
" " ".....	Patrice L. Legere.....	" 14, 1903..	70 00
Cox's Point.....	Alexander McBain.....	May 26, 1898..	95 00
Cassie's Point.....	Charles LeBlanc.....	" 4, 1872..	320 00
Cape Spencer, Alarm.....	Fred. G. Blacklock.....	Mar. 3, 1888..	460 00
Cherry Island.....	Harry Chaffey.....	Oct. 14, 1903..	205 00
Cocagne Range.....	Dominique Gognen.....	" 14, 1907..	150 00
Church Point (Buctouche).....	D. O. Maillett.....	July 7, 1883..	180 00
Dalhousie.....	James Arseneau.....	June 18, 1894..	130 00
Dipper Harbour.....	Fenwick Belmore.....	Mar. 12, 1895..	155 00
Douglas Island and P. W. Montgomery's Isl.	Henry McNeil.....	Jan. 1, 1880..	295 00
East Hd. Musquash.....	Chas. P. Hamm.....	" 14, 1879..	345 00
Eseuminae Alarm and Light.....	Kenneth R. McLennan.....	Mar. 7, 1892..	880 00
Fox Island, Upper, Light.....	Seymour Williston.....	June 4, 1902..	300 00
" Lower ".....	George Mills.....	" 23, 1897..	240 00
Fanjoy's Point.....	William Fanjoy.....	Dec. 15, 1897..	95 00
Flewelling's Wharf.....	Mary Flewelling.....	April 12, 1890..	95 00
Port Folly.....	Amos P. Belliveau.....	June 23, 1903..	265 00
Gagetown.....	Fraser Fox.....	April 22, 1904..	95 00
Grindstone Island Alarm.....	James R. Russell.....	Jan. 13, 1899..	800 00
Gannet Rock Alarm.....	Coleman Dalzell.....	July 1, 1904..	1,100 00
Green Head.....	Thos. E. Looney.....	July 14, 1886..	200 00
Grant's Beach.....	John Delaney.....	Oct. 7, 1880..	150 00
Gull Cove.....	Lewis Frankland.....	Nov. 14, 1902..	100 00
Goose Lake.....	John D. Brune.....	May 11, 1888..	295 00
Grand Harbour.....	Lloyd C. Dakin.....	" 2, 1904..	485 00
Grand Manan, Fog Alarm.....	George T. Tatton.....	Oct. 16, 1866..	800 00
Gray's Landing.....	B. F. McCutcheon.....	Mar. 6, 1907..	80 00
Head Harbour Light and Fog Alarm.....	Chas. D. Hyliard.....	June 29, 1904..	800 00
Heron Island.....	John A. D. Robertson.....	April 1, 1902..	240 00
Hendry's Point, Washademoak Light.....	Miss A. M. Hendry.....	Mar. 15, 1899..	95 00
Hay Island.....	Joseph Allain.....	May 21, 1895..	180 00
Harper's Point.....	Lawrence Blakley.....	Sept. 9, 1887..	90 00
Hampstead.....	Edgar B. Palmer.....	Nov. 6, 1900..	95 00
Indian Point.....	John De Grace.....	June 4, 1889..	180 00
Jemseg.....	Geo. F. Nevers.....	Nov. 24, 1884..	95 00
Kouchibouguac.....	Henry Gagnon.....	June 26, 1908..	180 00
Letete Fog Alarm and Light.....	Sydney Dines.....	Mar. 27, 1907..	640 00
Light Ship (Miramichi).....	Capt. Robt. McLean.....	April 12, 1902..	825 00
Little Belledune (Miscou Gully).....	J. A. Roberty.....	Feb. 21, 1905..	295 00
Little Shippegan.....	Robt. McConnell, jr.....	Sept. 9, 1887..	130 00
Long Point Bellisle Light.....	James A. Bates.....	June 1, 1907..	95 00
Machias Seal Island Light and Fog Alarm.....	W. L. Harvey.....	July 8, 1904..	1,150 00
Midgie Bluff Light.....	Arthur Henderson.....	Oct. 4, 1894..	200 00

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STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of
of Canada.—*Continued.*NEW BRUNSWICK—*Continued.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Miscou.	Joseph L. Robichaud.	Nov. 11, 1902..	800 00
Miramichi Draw Bridge.	Edward Sinclair, Company.		
Musquash.	R. P. McDonald.	Jan. 28, 1901..	145 00
Middle Island.	Michael Murray.	April 10, 1902..	240 00
Mark's Point.	Wm. Maloney.	Nov. 7, 1903..	150 00
McMann's Point.	Harvey R. McMann.	Jan. 2, 1901..	95 00
Mulholland's Point.	Alvin Parker.	June 13, 1901..	200 00
Negua.	John Robinson.	" 30, 1896..	200 00
Negua Range.	Chas. McIntosh.	Dec. 10, 1892..	130 00
Negro Head Submarine Bell.	Alfred Splane.		250 00
Negro Town Point.	E. Ross.	Mar. 5, 1878..	460 00
Newcastle.	Blackstock Matheson.	April 18, 1898..	100 00
Oak Point, St. John River Light.	Mrs. Bessie May Francombe.	Dec. 20, 1907..	95 00
Oromocto Shoals Light.	R. Brennan.	Mar. 18, 1903..	120 00
Oak Point (Miramichi) Light.	John Bowie.	June 2, 1906..	130 00
Partridge Island Light and Fog Alarm.	Hugh Andrews.	May 1, 1906..	1,200 00
Pokemouche Light.	Michael Hayden.	Oct. 17, 1888..	300 00
Portage Island.	Peter Morrison, Jr.	May 17, 1892..	325 00
Pt. Lepreaux.	Robert L. Belding.	June 30, 1905..	450 00
Pt. Lepreaux Fog Alarm.	Frank Frauley.	" 30, 1905..	900 00
Pea Point Light.	Elias C. Dickson.	Nov. 16, 1898..	320 00
Passamaquoddy Bay Light, West.	Joseph Kilpatrick.	Feb. 3, 1898..	485 00
" " East.	Theobald Rooney.	Jan. 1, 1896..	395 00
Preston's Beach.	Stanislaus Preston.	July 11, 1889..	150 00
Petit Roucher.	J. B. Boudreau.	Feb. 26, 1896..	180 00
Peck's Point L. and F. A.	Edwin Lockhart.	Oct. 20, 1903..	490 00
Poquesuide Light.	Octave Hachey.	July 12, 1881..	250 00
Palmer's Point.	Robert E. Pickett.	May 11, 1897..	95 00
Pointe Brulee.	Frank Gould.	Jan. 13, 1899..	80 00
Ponite du Chene.	Thomas Harts.	Feb. 17, 1905..	95 00
Pointe Spain.	Victor Daigle.	May 28, 1903..	60 00
Perry's Point.	John Carney.	Sept. 25, 1900..	95 00
Quaco.	Charles Brown.	Nov. 25, 1884..	400 00
" Breakwater.	Fred M. Cochran.	Mar. 25, 1892..	155 00
" Fog Alarm.	L. B. Bradshaw.	Aug. 2, 1887..	400 00
Robertson's Point.	Chas. W. Robertson.	June 30, 1897..	95 00
Richibucto.	Peter F. Richard.	May 30, 1895..	230 00
" Beacon.	Jude Robichaud.	June 16, 1902..	200 00
" Bar.	Joseph F. Richard.	June 16, 1902..	180 00
** " N. Beach.	Thos. McNeil.		150 00
Reid's Point.	Henry A. Wheaton.	Nov. 15, 1908..	80 00
Railway Wharf, Moffat's Ledge.	Geo. Cumming.	Jan. 1, 1880..	130 00
South Tracadie.	Wm. C. Ferguson.	Mar. 23, 1898..	180 00
Swallow Tail.	Geo. Y. Dalzell.	Mar. 18, 1893..	485 00
St. Andrew's.	W. J. Pendlebury.	April 10, 1889..	320 00
Spruce Point.	Bertie G. Hannah.	Sept. 15, 1892..	150 00
Sand Point.	Richard Wagner.	June 7, 1883..	95 00
Shediac.	M. Robinson.	Dec. 29, 1873..	295 00
Southern Wolf.	Ethelbert Wright.	Mar. 6, 1906..	555 00
Shippigan.	Adelard Savoie.	April 2, 1906..	350 00
Sheldrake Island.	Duncan Morrison.	Feb. 25, 1880..	300 00
Scuth West Head.	Clyde S. Ingersoll.	July 10, 1907..	555 00
Stonehaven.	Mrs. Elizabeth Scott.	July 8, 1904..	130 00
The Cedars.	Forrest Williams.	May 11, 1897..	95 00
Tracadie.	Fabien D. Basque.	Aug. 20, 1904..	300 00
Tiner's Point Fog Alarm.	Alfred Splane.	Aug. 21, 1905..	800 00
Wilmot's Bluff.	J. H. True.	Sept. 12, 1899..	95 00
Washademoak Lake.	See Hendry's Farm.		

** Died February 9, 1909.

BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC.

Algernon Rock.	Geo. Leclerc.	July 30, 1901..	700 00
Amherst Island.	Wm. Cormier.	April 26, 1871..	395 00
Anticosti, east point.	Christopher Hubert.	July 27, 1907..	760 00
Anse St. Jean.	F. Lavioie.	Mar. 13, 1889..	60 00
Ans à l'Eau.	Aug. Gingras.		60 00

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STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of
of Canada.—Continued.

BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC.—Continued.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary
			\$ cts.
Anticosti, south point.....	Emile Laprise.....	April 18, 1903..	920 00
" south-west point.....	Z. Lemieux.....	July 10, 1900..	700 00
" west point.....	Alf. Malouin.....	July 1, 1877..	850 00
Ash and Bloody Islands, Range.....	Jas. Alex. McGee.....	May 26, 1903..	240 00
*Barachois de Malbaie.....	F. X. Lemieux.....	Mar. 6, 1903..	75 00
Barre à Boulard.....	Nap. Daigle.....	May 28, 1904..	240 00
".....	Phileas Abel.....	June 23, 1903..	95 00
Batiscan "F".....	L. Fugère.....	April 29, 1868..	95 00
" "B".....	Jos. L. Brunelle.....	April 27, 1905..	95 00
Becancour "F".....	Omer Gingras.....	Oct. 24, 1905..	180 00
" "B".....	A. Tourigny.....	Oct. 24, 1905..	130 00
Bellechasse.....	Jos. L'Écuyer.....	June 15, 1903..	400 00
Belle Isle.....	Jean Louis Thibadeau.....	Oct. 25, 1907..	1,600 00
" north-east point.....	Paul Thomas.....	July 8, 1904..	1,350 00
Belle River Park.....	Chas. Roy.....	Aug. 5, 1904..	200 00
Bersimis.....	Henri Grenier.....	Aug. 8, 1903..	130 00
Bicquette.....	Louis Pinault.....	Oct. 6, 1900..	800 00
Bird Rocks.....	W. Bourque.....	Nov. 15, 1905..	1,350 00
Boucherville.....	Hilodore Carrière.....	Aug. 26, 1903..	15 00
Brandy Pots.....	Alphonse Richard.....	Oct. 7, 1878..	460 00
Bryon Island.....	Procule Chevrier.....	June 23, 1905..	460 00
Cap aux Corbeaux.....	Edward Coudé.....	Oct. 26, 1905..	80 00
Cap au Saumon.....	Louis Bouchard.....	May 16, 1896..	760 00
Cap aux Oies.....	Capt. Thos. Tremblay.....	May 1, 1888..	295 00
Cap Bauld.....	Edmond Fontaine.....	Sept. 1, 1905..	920 00
Cap Charles "B".....	Amédée Baron.....	June 26, 1901..	100 00
" "F".....	Alcide Boisvert.....	July 26, 1901..	95 00
Cap Chatte.....	Luc Côté.....	Dec. 3, 1901..	670 00
*Cap Despair.....	Charles Bourget.....	Nov. 1, 1897..	460 00
Cap Gaspé.....	Frs. Le Huquet.....	Oct. 22, 1896..	700 00
Cap Madeleine "B".....	J. F. Sasseville.....	June 9, 1886..	800 00
" (A) "F".....	Moïse Hébert.....	May 11, 1888..	95 00
" (A) "B".....	G. Vaillancourt.....	Oct. 1, 1906..	130 00
" "F".....	Pierre Toupin.....	April 26, 1905..	95 00
" Upper Lts. B.....	Elzéar Beaumier.....	Oct. 1, 1905..	130 00
" Village Range.....	Ernest Lacourse.....	Mar. 13, 1906..	200 00
Cap Anguille.....	Alfred Petry.....	April 12, 1890..	1,150 00
Cap Norman.....	J. W. Campbell.....	Oct. 19, 1884..	880 00
Cap Ray.....	E. H. Rennie.....	Oct. 19, 1884..	920 00
Cap Rosier.....	Eug. Costin.....	Nov. 4, 1890..	920 00
Carleton Point.....	Louis Bujoid.....	May 25, 1899..	345 00
" Wharf.....	Francis Cullen.....	July 12, 1907..	75 00
Champlain "B".....	Louis Bertrand.....	Sept. 12, 1902..	130 00
" "F".....	Philippe L. Carignan.....	Oct. 1, 1902..	95 00
Chambly Basin Range Lights.....	Jos. de Senneville.....	May 23, 1907..	150 00
Chambly Canton Range Wharf.....	Joseph Savage.....	July 10, 1907..	240 00
Chicoutimi, Lights—			
Chicoutimi Wharf.....	André Harvey.....	May 30, 1889..	60 00
Rivière Caribou "B".....	H. Simard.....	Mar. 1, 1905..	70 00
" "F".....	John Savard.....	Mar. 1, 1905..	70 00
Rivière du Moulin "B".....	Luce Gourdeau.....	May 9, 1905..	70 00
" "F".....	George Tremblay.....	Sept. 19, 1899..	70 00
Rivière Valin (Range).....	Maximin Lavoie.....	Summer, 1893..	120 00
Savard's Valin (Range).....	Dorilas Savard.....	July 18, 1904..	120 00
Poste St. Martin "F".....	Alfred Pilote.....	April 22, 1907..	70 00
" "B".....	Frs. Gauthier.....	April 22, 1907..	70 00
Chlorydorme.....	Magloire Coulombe.....	Oct. 15, 1904..	130 00
Contrecoeur, Course "B".....	Norbet Duval.....	April 22, 1904..	130 00
" "F".....	Joseph Arpin.....	Sept. 12, 1902..	100 00
" Traverse "B".....	Alfred Lacroix.....	July 26, 1904..	130 00
" "F".....	Joseph Alcidas Lacroix.....	April 14, 1904..	90 00
" " St. Ours.....	J. B. Laporte.....	April 26, 1904..	150 00
" " Traverse.....	Anasthase Gaudet.....	Oct. 1, 1908..	100 00
" Verchères "B".....	Ernest Guyon.....	Nov. 11, 1904..	150 00
" "F".....	Honoré Tétrault.....	Nov. 11, 1904..	150 00
Crane Island.....	Désiré Vézina.....	April 25, 1904..	360 00

** Died Feb. 9, 1909. *\$25 extra for blowing fog-horn.

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STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of
of Canada.—Continued.

BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC—Continued.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ c.
Domaine F. Range.....	Edward Gerard.....	May 30, 1908..	80 00
Domaine B. Range.....	Xavier Emond.....		80 00
Duthies Pt.....	B. W. Willette.....	Oct. " 16, 1903..	90 00
Eboulements.....	Wilfrid Bouchard.....	April 25, 1906..	65 00
Egg Island.....	Tancrède Pelletier.....	July 1, 1901..	530 00
Entry Island.....	Geo. F. Cullins.....	*July 30, 1901..	295 00
Etang du Nord.....	Nectaire Arsenau.....	July 21, 1891..	395 00
Escoumains Range Lts.....	Saguenay Lumber Co.....	Sept. 10, 1906..	150 00
Fame Pt.....	Jas. Ascah.....	Sept. 2, 1880..	1,200 00
Father Point.....	Jno. McWilliams.....	May 20, 1893..	450 00
Father Pt. Fog Alarm.....	J. G. Blanchet.....	July 21, 1904..	800 00
Flower Island.....	Jos. Lavallée.....	April 12, 1905..	700 00
Forteau.....	Thos. Wyatt.....	Oct. 18, 1899..	1,200 00
Fox River.....	André Samuel.....	Oct. 15, 1904..	130 00
Gallia Bay Upper Range.....	Elz. Cantara.....	May 3, 1904..	350 00
Gallia Bay Lower Range.....	Louis Peloquin.....		350 00
Gascons Wharf.....	John Maurant.....	June " 8, 1906..	75 00
Gaspé Basin.....	William Lindsay.....	June 14, 1900..	60 00
Gentilly "B".....	Delphis Mailhot.....	April 2, 1907..	150 00
Gentilly "F".....	Adolphe Lebleu.....	April 6, 1907..	250 00
Grande Entrée.....	André Turbide.....		70 00
Grande Rivière.....	William Bisson.....	Oct. 22, 1896..	150 00
Grand River Wharf.....	J. B. Couture.....		60 00
Grande Vallée.....	A. Fournier.....	April 14, 1900..	130 00
Green Island.....	R. W. Lindsay.....	Sept. 28, 1888..	700 00
Greenly Island.....	Map. Côté.....	Oct. 12, 1903..	1,150 00
Griffons Cove.....	H. Boulet.....	June 29, 1908..	130 00
Grondines "B".....	Jos. Sauvageau.....	June 20, 1904..	130 00
" " "F".....	Eugène Mayrand.....	" " "	170 00
Grondines Pt. "B".....	Emile Houde.....	" " "	130 00
" " "F".....	Achille Sauvageau.....	" " "	295 00
Grosse Roche.....	Nazaire Morin.....	June 25, 1906..	500 00
Guard Pier.....	Benj. Rodier.....	Sept. 10, 1907..	500 00
Hochelaga "R".....	Alphonse Chartier.....	Aug. 5, 1904..	200 00
Hospital Rock.....	Victor Lavoie.....	April 1, 1909..	240 00
Isle Ronde.....	Herman Chartrand.....	Aug. 1, 1907..	500 00
Ile à la Baguette.....	Louis Dubois.....	April 14, 1903..	180 00
Ile à l'Aigle "B".....	Eug. Savarie.....	May 1, 1903..	130 00
Ile à l'Aigle "F".....	F. X. Lapointe.....	" " "	130 00
Ile aux Coudres.....	Eustache Boudreault.....	April 20, 1906..	60 00
Ile des Barques.....	Omar Salvail.....	May 6, 1897..	295 00
Ile de Grâce "B".....	Louis Letendre.....	April 1, 1906..	130 00
" " "F".....	Ed. Paul.....	Sept. 7, 1871..	240 00
Ile du Pads Range.....	Zotique Courscheine.....	Aug. 8, 1907..	300 00
Ile du Moine "B".....	Paul Mongeau.....	Dec. 27, 1906..	150 00
" " "F".....	Etienne Provencal.....	Dec. 27, 1906..	130 00
Ile aux Raisins Range.....	Louis Boucher.....	April 13, 1898..	285 00
Ile Bouchard.....	F. Ivan Laporte.....		150 00
Ile Bouchard.....	Alphonse Chicoine.....	June 16, 1903..	95 00
Ile Deslauriers.....	Nap. Langevin.....	Dec. 18, 1906..	150 00
Ile Ste. Thérèse (Upper Range).....	Sam Reeves.....	Oct. 12, 1870..	300 00
Ile Ste. Thérèse (Lower Range).....	Jos. Malo.....	Feb. 1, 1897..	150 00
Ile des Lanriers "B".....	P. Choquet.....	March 13, 1908..	95 00
Ile au Bélier Lac St. Jean.....	Wm. Gaudreault.....	Oct. 30, 1901..	100 00
Kamouraska.....	Arthur Levesque.....	Feb. 19, 1901..	460 00
Lacolle.....	W. G. Whitman.....	Jan. 18, 1904..	150 00
Louisville Range Lts.....	Onésime Plante.....	June 23, 1907..	150 00
Longue Pointe Traverse "R".....	James Fletcher.....	May 16, 1904..	150 00
Lake Memphremagog.....			
Black Pt.....	Jas. P. H. Peters.....	June 1, 1891..	60 00
Lead Mines.....	W. Wheeler.....	" " "	60 00
Molson's Island.....	Miss E. Molson.....		80 00
Georgeville.....	C. E. Martel.....	May 19, 1905..	60 00
Wadleigh Pt.....	J. A. Patterson.....	June 1, 1891..	60 00
Witch Rock.....	D. E. Peters.....		140 00

*** \$25 extra for blowing fog horn.

SESSIONAL PAPER No. 21

STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of
of Canada.—*Continued.*

BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC—*Continued.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Lavaltrie (Range).....	Denis Giguère	May 24, 1870..	300 00
Lake St. Peter Lt. Ship No. 1.....	Desiré Lafèche.....	April 12, 1887..	510 00
" " " 2.....	Hector Fiset.....	April 22, 1875..	530 00
" " " 3.....	J. B. Weaner.....	May 9, 1904..	490 00
L'Islet Richelieu.....	Jos. Auger.....	Jan. 20, 1905..	150 00
Lotbinière "B".....	George Beaudet.....	Jan. 4, 1883..	95 00
" " " "F".....	Mrs. L. Beaudet.....	Sept. 3, 1903..	95 00
Magpie "R".....	Albert Dupuis.....	Sept. 14, 1907..	120 00
Maquereau Point.....	A. Bertrand.....	Dec. 21, 1877..	**345 00
Martin River.....	Aug. Leclerc.....	Sept. 3, 1902..	920 00
Matane.....	Jos. Banville.....	Feb. 1, 1897..	370 00
Metis.....	Elisée Caron.....	Mar. 28, 1906..	345 00
Montée du Lac (Range).....	W. Labranche.....	May 2, 1905..	460 00
Mont Louis.....	Ls. Létourneau.....	" 22, 1906..	130 00
Montmagny.....	Cap. H. Boulanger.....	April 13, 1878..	95 00
*Murray Bay.....	Elie Landry.....	July 28, 1906..	250 00
Natashquan.....	Solomon Grenier.....	June 3, 1897..	150 00
Nicolet Range "B".....	Edmond Héroux.....	Dec. 5, 1906..	130 00
" " " "F".....	Didier Héroux.....	" 5, 1906..	210 00
New Carlisle Wharf.....	John Chisholm.....	"	50 00
North Half Way Point (Range).....	Jos. Lord.....	May 5, 1903..	180 00
Oak Point.....	Thos. Harper.....	Jan. 1, 1907..	130 00
Orleans Range—			
Ange Gardien "B".....	Olivier Paré	Nov. 10, 1902..	80 00
" " " "F".....	F. Gagné.....	" 10, 1902..	80 00
Ste. Famille "B".....	Pierre Pâquet.....	Oct. 19, 1885..	75 00
" " " "F".....	Alfred Poulin.....	" 26, 1896..	80 00
St. Pierre "B".....	Honoré Roberge	" 19, 1885..	75 00
" " " "F".....	Olivier Vézina.....	" 28, 1897..	80 00
**Paspebiac.....	John Loisel.....	Aug. 27, 1894..	180 00
Percé.....	Florian Bourget.....	Mar. 18, 1893..	200 00
Perroquet.....	Placide Vigneau.....	Sept. 19, 1892..	625 00
Petite Traverse (Contrecoeur) "B".....	Ed. St. Laurent.....	April 22, 1904..	130 00
" " " "F".....	Louis Caisse	" 22, 1904..	100 00
Pilgrims.....	H. Morin.....	" 29, 1898..	385 00
Plateau.....	Geo. St. Croix.....	Oct. 22, 1896..	460 00
Platon (Range).....	Chas. Beaullet.....	Aug. 24, 1894..	150 00
Pte à Basile "B".....	Antonio Demers.....	July 22, 1904..	150 00
" " " "F".....	Elzéar Douville.....	Feb. 6, 1904..	150 00
Pointe à Garde Light-ship.....	Chas. Brown.....	June 26, 1904..	370 00
" aux Citrouilles.....	Widow F. Marchand.....	July 3, 1906..	240 00
" aux Orignaux.....	Dominique Levesque.....	Oct. 5, 1903..	360 00
" Bleue.....	Armand Tessier.....	June 9, 1904..	60 00
" des Monts.....	Victor Fafard.....	Aug. 1, 1899..	700 00
" du Lac.....	Sylvis Paquin.....	May 2, 1900..	130 00
" Echouerie.....	Pitre Bourdage	July 25, 1903..	210 00
" Noire.....	J. E. Boulaine.....	Jan. 18, 1904..	240 00
" Riche.....	N. Breton.....	May 16, 1896..	530 00
" St. Jean.....	Ls. Lachance.....	Sept. 26, 1896..	300 00
" St. Laurent.....	Joachim Godbout.....	April 15, 1904..	300 00
**Port Daniel.....	F. X. Langlois.....	Feb. 22, 1907..	75 00
" West.....	Arthur Horrie.....	Jan. 1, 1907..	130 00
Portneuf (a) Range.....	Josephine Rodrique.....	Dec. —, 1900..	295 00
" " below.....	Pierre Poitras.....	Oct. 16, 1904..	130 00
" " ".....	Edmond Tremblay.....	May 7, 1903..	345 00
" " ".....	Joseph F. Boudreault.....	Oct. 29, 1907..	130 00
Point aux Esquimaux.....	Frs. Manseau.....	Mar. 27, 1900..	285 00
Port St. François (Range).....			

* Now lit by electricity.

** \$25 extra for blowing fog-horn.

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STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of
of Canada.—*Continued.*BETWEEN MONTREAL AND QUEBEC AND BELOW QUEBEC—*Continued.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Quebec Harbour.....	Harbour Commission.....		60 00
Red Island Lighthouse.....	P. T. Fraser.....	April 12, 1890..	510 00
Repentigny "B".....	L. L. Rivet.....	" 28, 1894..	90 00
" "F".....	J. Bte. Lachapelle.....	Feb. 1, 1861..	90 00
Rimouski.....	Ubalde Lavoie.....	May 22, 1906..	65 00
Rivière à la Pile.....	Alex. Morin.....	Oct. 3, 1901..	77 50
" du Chêne, Anglais Pt.....	Ant. Langlois.....	July 11, 1888..	150 00
" du Loup.....	F. E. Gilbert.....	Sept. 22, 1902..	80 00
" St. François.....	Phileas Desmarais.....	July 2, 1897..	180 00
Roberval.....	Electric Light Co.....	June 28, 1898..	100 00
Sand Beach.....	Thomas Kennedy.....	Aug. 9, 1904..	460 00
St. Alphonse.....	Pitre Tremblay.....	June 19, 1895..	60 00
St. Antoine.....	Leonidas Frechette.....	March 4, 1902..	95 00
".....	Francois Doré.....	April 14, 1903..	130 00
St. Siméon.....	Henry Savard.....	Oct. 25, 1906..	60 00
Ste. Anne des Monts.....	X. Lafrancois.....	" 15, 1904..	130 00
Ste. Anne de Sorel "F".....	Frs. Lanceault.....	Mar. 28, 1906..	100 00
" " "B".....	Pierre Cournoyer.....	" 28, 1906..	130 00
Ste. Croix.....	Willie A. Thurber.....	" 18, 1901..	180 00
" Bar.....	Telephore Courteau.....	" 28, 1901..	80 00
Ste. Croix.....	Widow D. Racette.....	Dec. —, 1900..	80 00
Ste. Emélie, Back Light.....	Emery Filteau.....	Mar. 16, 1905..	95 00
" Front Light.....	A. Laliberte.....	Sept. 24, 1888..	100 00
St. François, I.O. "F".....	Jos. Lepage.....	April 20, 1876..	90 00
" "B".....	Ls. Marceau.....	" 1, 1884..	90 00
St. Petronille, I.O.....	Nap. Ferland.....	Sept. 3, 1904..	250 00
St. Pierre les Becquets.....	Henri Perreault.....	May 26, 1901..	80 00
Ste. Felicité Fog Alarm.....	Frs. Belanger.....	Jan. 14, 1905..	640 00
St. Valentin Range.....	Paul Martin.....	April 28, 1873..	150 00
Seven Islands.....	Alfred Arcand.....	May 20, 1898..	960 00
Ste. Anne Range "F".....	Cezare Dufour.....	" 21, 1908..	75 00
" "B".....	Alphonse Poulin.....	" 21, 1908..	75 00
Sorel Harbour.....	R. & O. Nav. Co. Assistant.....	Sept. 6, 1854..	**85 00
Trois Pistoies.....	Cyrille LeBel.....	Oct. 25, 1907..	125 00
Three Rivers.....			
Upper Traverse Pier.....	Alfred Fournier.....	April 14, 1900..	760 00
Upper Champlain Basin "B".....	Louis Pothier.....	" 1, 1906..	130 00
" " "F".....	Joseph Massicotte.....	" 1, 1906..	100 00
Varennes.....	Azarie Geoffron.....	May 1903..	80 00
Verchères Traverse, "B".....	Phileas Charbonneau.....	April 21, 1902..	80 00
" " "F".....	F. X. Chicoine.....	" 21, 1902..	95 00
Verchères, Village, "B".....	Felix Bourquet.....	" 21, 1902..	80 00
" " "F".....	Joseph Guyon.....	" 21, 1902..	95 00

**Continued from "Trinity House." \$120 per annum with \$10 per annum increase to maximum of \$160.

ABOVE MONTREAL.

Aylmer, P.Q.....	Francis Boucher.....	May 3, 1907..	180 00
Arnprior Island (Lower).....	William Kilroy.....	Oct. 1, 1905..	180 00
Allumette Island (Lower).....	John Manders.....	Aug 7, 1907..	130 00
".....	John Cox.....	June 22, 1887..	130 00
Argenteuil Bay.....	Joseph Giroux.....		100 00
Bamford Island.....	Robert Bamford.....	" 21, 1888..	320 00
Barriefield Common Range.....	William Murray.....	May 17, 1900..	180 00
Baskin's Wharf.....	Silas Sullivan.....	Dec. 22, 1896..	130 00
Battle Island.....	C. S. McKay.....	Aug. 27, 1877..	555 00
Beauharnois.....	Alphonse Dault.....	April 14, 1903..	260 00
Belleville.....	J. C. Weir.....	" 4, 1901..	240 00
Blind River Range.....	W. H. McGauley.....	" 28, 1908..	60 00
Boyd Island (see Spanish River).....			
Bois Blanc.....	Agnes Hackett.....	June 22, 1901..	460 00

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STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of
of Canada—*Continued.*ABOVE MONTREAL—*Continued.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Black Bear Island	Daniel Matheson	June 22, 1899..	270 00
Blind River Wharf, Ltd.	The Eddie Co.		60 00
Brown's or Knapp's Pt	Jos. J. Brophy	May 9, 1905..	205 00
Bishop's Bay Range	F. Cutler	July 20, 1908..	150 00
Brebeuf Range	W. Baxter	May 23, 1885..	400 00
Brighton Range	H. V. Simpson		540 00
Bronte	Chas. Osborne	Oct. 20, 1906..	250 00
Buckoin's Point	Godfrey Ouillet	Feb. 23, 1884..	200 00
Burlington Beach	Thomas Lundy	May 2, 1905..	485 00
Byng Inlet & Gireaux Island ..	Louis Lamondin	July 20, 1901..	425 00
Cabot Head	Charles Webster	May 10, 1898..	880 00
Campbell Island	Robert Wilson	Jan. 8, 1905..	180 00
Caribou Island	Antoine Boucher	May 3, 1907..	1,150 00
Cape Robert	N. Matheson	Oct. 2, 1896..	360 00
Cape Croker	R. Chapman	Nov. 13, 1902..	1,050 00
Caron Point	Honore Sauvé	May 1, 1889..	75 00
Cox Reef, Man.	Wm. Doré	Jan. 11, 1908..	385 00
Cecebe Lake	John Schade	Aug. 29, 1906..	250 00
Centre Brothers Island	D. Wemp	Jan. 9, 1901..	240 00
Chantry Island	Maleolm McIver	April 1, 1907..	530 00
Cherry Island	I. S. Johnson	Nov. 5, 1883..	300 00
Christian Island	Allan Collins	Mar. 25, 1891..	485 00
Clapperton Island	Henry F. Baker	Dec. 2, 1895..	385 00
Cobourg	Robert Gordon	May 16, 1883..	225 00
Colchester Reef	John Manson	May 1, 1888..	850 00
Cole's Shoal	R. P. Boyd	April 9, 1884..	295 00
Collingwood	Jas. W. Lunan	Jan. 2, 1904..	420 00
Coppermine Point	J. J. Rosseau	June 27, 1904..	130 00
Corby Point	Joseph Davieau	May 27, 1890..	385 00
Cornwall Canal and Hamilton Range ..	Reni Casgrain	April 1, 1906..	300 00
Corunna	W. J. Scott	" 23, 1901..	150 00
Coteau Landing	Thos. Filiatreault	May 27, 1890..	150 00
Coulouge Lake	Felix Bertrand	April 2, 1892..	130 00
Cove Island	Kenneth McLeod		880 00
Darlington	Port Darling Har. Co		100 00
Deep River Island	Jos. Beauchamp		130 00
Deseronto	Rathbun Company	Oct. 14, 1884..	200 00
Dorval and St. Claire	Benjamin Cloude	Aug. 1, 1907..	400 00
False Ducks	Darland Dulmage	May 19, 1903..	800 00
Ferris Island	Jonathan Morrison	March 1, 1908..	240 00
Flower Pot Island	John Parker	" 3, 1907..	300 00
Fort William, Upper Ottawa	Jas. McCool, sr.	May 23, 1887..	90 00
Frenchman's Bay	Wm. O'Brien	April 14, 1904..	150 00
French River and Bustard R.	Mrs. E. B. Borron	Jan. 20, 1903..	555 00
Fox Island, Lake Simcoe	John Prosser	Sept. 14, 1896..	250 00
Gananoque Narrows and Jackstraw Shoal ..	Mrs. Manly Cross	Jan. 2, 1908..	550 00
Gargantua	Louis Miron	Oct. 26, 1899..	485 00
Giant's Tomb	A. H. Griffith	Sept. 17, 1898..	300 00
Gibraltar Point	P. J. McSherry	May 2, 1905..	400 00
Goderich	Robert Campbell	June 9, 1886..	460 00
Gore Bay	Angus Matheson	July 10, 1903..	385 00
Gravenhurst	Isaac Barnes	Mar. 20, 1906..	120 00
Graham Front	W. Graham	Dec. 19, 1904..	75 00
" Back	X. Sicard	April 29, 1905..	75 00
Great Duck Island	John Purvis	May 9, 1898..	880 00
Green Shoal	Alberte Laberge	" 20, 1902..	200 00
Grenadier Island	Albert Root	Dec. 15, 1863..	180 00
Griffith Island	W. T. Boyd	May 14, 1889..	485 00
Grosse Point	William Shannon	Sept. 27, 1866..	460 00
Gull Island	James Roddick	" 7, 1907..	530 00
Gull Harbour	Thor. Fjeldstedt	May 6, 1904..	180 00
George's Island (Lake Winnipeg) ..	Chas. T. Whiteway	June 16, 1906..	406 00
Hope Island	Charles Vallée	April 20, 1899..	450 00

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STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of
of Canada—*Continued.*ABOVE MONTREAL—*Continued.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Isle Perrot.....	Ank. McNabb.....	May 20, 1905..	130 00
Jackfish Bay.....	Ben. Almos.....	Oct. 1, 1907..	50 00
Jones Island, Georgian Bay.....	Ed. Taylor.....	June 3, 1901..	800 00
" Range, Ottawa River.....	John Paquette.....	April 13, 1893..	100 00
Kagawong.....	W. M. Boyd.....		80 00
Kaministiquia.....	John Armstrong.....	April 28, 1894..	300 00
Killarney.....	Frank Roque.....	Feb. 28, 1905..	400 00
Kincardine.....	Thos. McGaw, jr.....	June 13, 1889..	460 00
Kingsville.....	W. H. Black.....	July 27, 1902..	180 00
Kitchener Island.....	P. J. Sullivan.....	Oct. 25, 1907..	400 00
Lamb Island.....	Andrew Alexander.....	April 26, 1897..	555 00
Lancaster Bar and Pier.....	J. J. Munroe.....	June 8, 1892..	425 00
Leamington.....	F. H. C. Conover.....	April 28, 1883..	180 00
Lime Kiln Crossing.....	Stephen Pettypiece.....	May 11, 1888..	350 00
Lion's Head.....	Charles Knapp.....	Oct. 28, 1903..	75 00
Little Current.....	David Boyter.....	April 22, 1903..	360 00
Little Gross Cap.....	W. T. Richardson.....	Sept. 27, 1900..	200 00
Lonely Island.....	Jean Haitse.....	May 11, 1885..	725 00
Long Point, east end.....	S. B. Cook.....	June 9, 1897..	800 00
" west end.....	F. E. Mason.....	" 3, 1901..	460 00
L'Orignal.....	Gregoire Seguin.....	May 8, 1894..	130 00
Lower Narrows.....	J. B. Leblanc.....	Jan. 4, 1904..	130 00
Lyal Island.....	John McKay.....	Oct. 27, 1884..	510 00
Manitowaning.....	John Gourley, jr.....	July 3, 1900..	150 00
Meaford.....	Samuel Dutcher.....	May 7, 1877..	200 00
Michipicoten Island.....	Hyacinthe Davieau.....	July 1, 1881..	460 00
Michipicoten Harbour.....	W. T. Richardson.....	Sept. 27, 1900..	270 00
Middle Island.....	John L. Lidwell.....	July 10, 1889..	395 00
Middle Range.....	Nap. Somers.....	June 19, 1900..	240 00
Mississagi Strait.....	J. H. Ball.....	May 7, 1900..	880 00
Mississagi Island.....	L. D. McDonald.....	May 16, 1896..	460 00
Mohawk Island.....	R. O. Smithers.....	March 31, 1896..	460 00
Morris Island.....	Mrs Catherine Rowan.....	April 1, 1908..	150 00
McKay's Point.....	Joseph Harvey.....	July 10, 1907..	300 00
McKie's Point.....	Dosithée Daoust.....	Sept. 21, 1893..	180 00
McQuestion Point.....	Elizabeth McLeod.....	Feb. 22, 1904..	130 00
McTavish.....	J. Campbell.....	Nov. 18, 1896..	130 00
Narrow Island.....	A. B. Boyter.....	Jan. 3, 1898..	320 00
Nine Mile Point.....	Stannes Veech.....	Mar. 7, 1894..	800 00
Nigger Island.....	Carson Jeffrey.....	April 28, 1894..	240 00
Niagara on the Lake.....	Fred Masters.....	Nov. 12, 1904..	460 00
" Range.....	Robert Allen.....	July 19, 1907..	180 00
Nottawasaga Island.....	J. F. Burmister.....	May 2, 1904..	555 00
Oakville Pier.....	Maurice Felan.....	April 28, 1894..	180 00
Oka and Wharf.....	H. Lacroix.....	Nov. 10, 1898..	150 00
Owen Sound.....	Archibald McLean.....	Dec. 23, 1897..	150 00
Otter Head.....	Robert McMenemy.....	Nov. 17, 1903..	460 00
Papineauville.....	Joseph Chabot.....	June 17, 1897..	125 00
Pelee Island.....	J. R. Lidwell.....	July 10, 1869..	325 00
Pelee Passage.....	F. Malott.....	Nov. 11, 1902..	500 00
".....	F. F. Goulin.....	Aug. 2, 1904..	550 00
".....	Louis Langlois.....	Feb. 25, 1903..	650 00
Peninsula Harbour.....	D. B. Hawkins.....	Aug. 31, 1891..	555 00
Pie Island.....	James Forbes.....	April 1, 1908..	325 00
Pigeon Island.....	J. H. Davis.....	May 16, 1896..	420 00
Point à Cadieux.....	Simeon Poirier.....	" 4, 1904..	180 00
Point au Baril.....	Ole Aanson.....	July 10, 1907..	345 00
Point Aux Anglais.....	Lucas H. Masson.....	Sept. 4, 1897..	240 00
Point Aux Pins.....	Alexander McKinnon.....	May 16, 1904..	400 00
Point Clark.....	M. McDonald.....	Jan. 8, 1897..	460 00
Point Edward.....	Louis Knauff.....	May 23, 1908..	180 00

SESSIONAL PAPER No. 21

STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of Canada.

ABOVE MONTREAL—Continued.

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Point Peter.....	G. J. Scott.....	June 6, 1901..	800 00
Point Pleasant.....	Frank Connors.....	Oct. 13, 1898..	345 00
Point Porphyr.....	Andrew Dick.....	Aug. 10, 1880..	450 00
Port Arthur.....	J. C. Banks.....	April 28, 1908..	265 00
Port Burwell.....	John Sutherland.....	June 18, 1894..	400 00
Port Colborne.....	D. A. Fortier.....	April 11, 1865..	550 00
Port Colborne Fog-Alarm.....	Hugh Clarke.....	May 30, 1904..	850 00
Port Credit.....	John Miller.....	Dec. 16, 1897..	180 00
Port Dalhousie.....	Bernard McGrath.....	Oct. 2, 1907..	345 00
" " Fog-Alarm.....	Bernard McGrath.....		
Port Elgin.....	R. M. Lowry.....	Mar. 14, 1896..	120 00
Port Dover.....	Silas L. Butler.....	July 15, 1897..	345 00
Port Maitland.....	Mrs. James Grant.....	June 29, 1907..	385 00
Port Stanley.....	John L. Oliver.....	Dec. 16, 1907..	345 00
Presqu' Isle.....	Hugh H. McKenzie.....	May 7, 1907..	205 00
Presqu' Isle Main.....	Hugh E. Smith.....	April 29, 1898..	350 00
" " ".....	W. B. Ainsworth.....	Oct. 12, 1907..	600 00
Providence Bay.....	John B. Sinclair.....	Mar. 6, 1906..	325 00
Rain's Wharf.....	W. W. Rain's.....	Ang. 1892..	70 00
Rainy River.....	Patrick O'Conuor.....	June 23, 1904..	295 00
*Red Rock.....	(see Snug Harbour).....		*
Red River Range.....	William Hughes.....	Feb. 12, 1892..	395 00
Richard's Landing.....	R. Armstrong.....	1907..	60 00
Rigaud.....	Capt. A Malette.....	Oct. 27, 1907..	150 00
Rondeau.....	W. R. Fellows, jr.....	Dec. 18, 1888..	420 00
Rosseau.....	J. G. Dixon.....	July 21, 1890..	130 00
Sailors' Encampment.....	A. M. Rains.....	Aug. 1, 1892..	80 00
Salmon Point.....	Amos McDonald.....	July 12, 1897..	345 00
Saugeen.....	D. McAulay.....	Mar. 16, 1899..	150 00
Scotch Bonnet.....	Cyrus R. Spencer.....	April 7, 1903..	425 00
Silver Islet.....	Capt. Jas. Cross.....	May 18, 1905..	130 00
Shoal Point.....	E. E. Rains.....	Nov. 24, 1884..	320 00
Slate Island.....	Alex. B. Sutherland.....	July 21, 1908..	490 00
Snake Island.....	John Whitmarsh.....	" 18, 1900..	350 00
*Snug Harbour.....	Adam Brown.....	April 11, 1900..	*
Southampton.....	James Brown.....	June 29, 1904..	180 00
South Bay Point.....	Marcellus Vorce.....	Nov. 21, 1902..	240 00
South Baymouth.....	John A. Ritchie.....	Sept. 10, 1903..	150 00
South River.....	Frederick Beacher.....	July 2, 1903..	120 00
South East Bay.....	Thomas Darling.....	Jan. 31, 1891..	90 00
Spanish River or Boyd Island.....	Mrs. Elizabeth Martin.....	" 6, 1905..	295 00
Ste. Anne de Bellevue.....	Jos. L. Stocker.....	May 20, 1902..	150 00
" " Locks.....	F. X. Demers.....	" 17, 1907..	85 00
St. Anicet Bar.....	Donald McKillop.....	June 8, 1892..	285 00
Ste. Placide.....	Joseph Lafleur.....	May 25, 1907..	170 00
Squaw Island.....	Neil McDougall.....	April 25, 1901..	240 00
Stag Island.....	Thos. M. Cowan.....	Nov. 3, 1903..	180 00
Stokes Bay.....	Alex. Smith.....	May 14, 1908..	240 00
Stripping Point.....	David Humes.....	Aug. 27, 1902..	225 00
Strawberry Island.....	William McKenzie.....	May 4, 1893..	370 00
Sulphur Island.....	J. J. King.....	" 15, 1905..	345 00
Thames River.....	H. J. Cartier.....	Oct. 19, 1884..	425 00
Thessalon.....	James Harvey.....	Nov. 28, 1897..	370 00
Tomahawk Island.....	Thomas Sweeney.....	Sept. 19, 1902..	95 00
Thornbury.....	Robert Lowe.....	April 12, 1887..	240 00
Telegraph Island.....	George A. Rowe.....	Oct. 25, 1895..	240 00
Thunder Cape.....	William Craig.....	May 17, 1892..	880 00
Tombormory.....	Archibald Currie.....	Oct. 12, 1903..	250 00
Trenton Harbour.....	William Fitzpatrick.....	Jan. 27, 1906..	150 00
Toronto, East Gap.....	George McKelvie.....	June 13, 1905..	960 00

* \$2.00 per day for this and Snug Harbour Light.

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STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of Canada—*Continued.*ABOVE MONTREAL—*Continued.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Victoria Island.....	George Cosgrove.....	Nov. 14, 1899..	420 00
Welcome Island.....	Adolph Perras.....	May 10, 1906..	760 00
Way Shoal.....	Moise Beauchamp.....	Nov. 20, 1906..	150 00
Warren's Landing.....	Hugh McDonald.....	Aug. 25, 1905..	400 00
Wabbi River.....	A. M. Ross.....	Oct. 25, 1895..	600 00
Weller's Bay.....	H. J. Chase.....	Nov. 4, 1898..	150 00
West Sister Rock.....	J. Thibault.....	Dec. 7, 1905..	420 00
Western Island.....	Thos. J. Richardson.....	June 27, 1. 01..	320 00
Whitby.....	Whitby Hbr. Co.....	1905..	100 00
Whiskey Island and Penetanguishene.....	Christopher Columbus.....	Mar. 18, 1893..	400 00
Wiarton.....	William Gilbert.....	Sept. 13, 1907..	75 00
Wilson's Channel.....	H. G. Duncan.....	Aug. 25, 1905..	360 00
Wolf Island.....	William Gillespie.....	Mar. 17, 1885..	250 00

BRITISH COLUMBIA.

Active Pass.....	H. Georgeson.....	July 21, 1884..	960 00
Amphitrite Point.....	G. W. Grant.....	April 2, 1906..	270 00
Berens Island.....	S. G. Harrison.....	Nov. 4, 1897..	397 50
Brockton Point.....	W. D. Jones.....	Aug. 20, 1890..	397 50
Brotsky Ledge.....	Thos. Sparks.....	Jan. 1, 1903..	120 00
Bare Point.....	J. Crozier.....	June 12, 1897..	210 00
Ballenas Island.....	M. Brown.....	Oct. 3, 1901..	922 50
Birnie Island.....	C. Rudge.....	May 2, 1905..	270 00
Balfour.....	J. W. Gallup.....	Jan. 1, 1900..	142 50
Cape Beale.....	W. L. Thompson.....	Sept. 16, 1908..	1,380 00
Carmannah Point.....	W. P. Daikin.....	Nov. 4, 1890..	1,350 00
Cape Mudge.....	J. Davidson.....	June 27, 1898..	450 00
Coffin Island.....	R. Harrap.....	April 15, 1903..	150 00
Crofton Light.....	R. Allan.....	May 31, 1907..	195 00
Discovery Island.....	M. A. Croft.....	April 1, 1902..	960 00
Dryad Point.....	C. Carpenter.....	Nov. 7, 1899..	397 50
Dock Point.....	Hugh Moore.....	May 15, 1903..	270 00
Danger Reef.....	R. Harrap.....	April 15, 1903..	150 00
Denman Island.....	J. A. McMillan.....	Aug. 15, 1906..	450 00
Entrance Island.....	M. G. Clark.....	Nov. 26, 1897..	1,200 00
Egg Island.....	J. W. Davies.....	May 2, 1905..	1,380 00
Estevan Point.....	A. Luckovich.....	April 1907..	668 50
".....	J. Bucholz.....	.....	770 00
Flsgard.....	Capt. Geo. Johnston.....	July 20, 1901..	500 00
Fiddle Reef.....	D. H. McNeill.....	Mar. 21, 1905..	450 00
Fraser River Lights and Garry Pt.....	A. A. Parker.....	July 1, 1907..	450 00
Gallows Point.....	Western Fuel Co.....	May 1906..	120 00
Green Island.....	S. Baker.....	June 21, 1907..	1,200 00
Ivory Island.....	F. Reuter.....	May 2, 1905..	922 50
Joan Point.....	R. Harrap.....	April 15, 1903..	180 00
Kaslo Spit.....	Kootenay Electric Co.....	Dec. 1, 1897..	240 00
Kyuquot Light.....	A. Ellis.....	Jan. 21, 1906..	270 00
Lawyer Island.....	F. W. B. Elsterman.....	April 1, 1905..	600 00
Lennard Island.....	R. Pollock.....	July 1, 1908..	1,500 00
Lennard Island.....	F. C. Gerrard.....	Mar. 31, 1905..	800 00
Lucy Island.....	Amos Hanson.....	May 12, 1908..	557 50
Lund Light.....	Gas Beacon, (No. keeper).....	.....	.....
Merry Island.....	W. T. Franklin.....	Jan. 8, 1904..	427 50
North Arm Lights.....	J. F. McMillan.....	Mar. 29, 1905..	270 00
Nanaimo Harbour.....	H. B. Shaw.....	June 12, 1907..	225 00
Point Atkinson.....	W. Erwin.....	Oct. 5, 1880..	1,300 00
Portlock Point.....	W. J. Gillespie.....	Nov. 1905..	487 50
Prospect Point.....	Jno. Grove.....	July 7, 1898..	397 50
Pointer Island.....	Jas. Codville.....	Dec. 26, 1899..	465 00

SESSIONAL PAPER No. 21

STATEMENT giving Names of Stations and Lightkeepers, &c., in the Dominion of
of Canada—*Continued.*

BRITISH COLUMBIA—*Continued.*

Name of Station.	Name of Lightkeeper.	Appointed.	Salary.
			\$ cts.
Portier Pass.....	F. Allison.....	Nov. 15, 1902..	500 00
Proctor.....	G. W. Gallup.....	Jan. 1, 1900..	270 00
Pilot Bay.....	E. Montreuil.....	Oct. 17, 1907..	500 00
Pine Island.....	A. B. Gurney.....	April 1, 1907..	1,380 00
Pultney Point.....	E. Hukkla (Temporary)...	Feb'y. 1, 1907..	500 00
Pachena Point.....	W. R. Pillar.....	Sept. 5, 1907..	1,500 00
Quatsino Light.....	G. H. Jackson.....	Jan. 29, 1907..	300 00
Race Rocks.....	F. Eastwood.....	" 21, 1891..	1,380 00
Saturna Island.....	Jas. Georgeson.....	Oct. 26, 1889..	660 00
Sand Head's Lt. Ship.....	M. O'Brien.....	" 1, 1904..	1,200 00
Sisters.....	B. Blanchard.....	Feb. 20, 1905..	922 50
Sechelt.....	Gas Beacon, (No keeper).....		
Scarlet Point.....	Wm. Hunt.....		397 50
Sechart Light.....	G. Strickland.....	Mar. 27, 1908..	195 00
Sooke Light.....	A. Codtel.....	April 15, 1907..	142 50
Trial Island.....	H. S. O'Kell.....	Aug. 20, 1906..	1,200 00
Victoria Harbour.....	Thos. Sparks.....	Jan. 29, 1903..	180 00
Walker Rock.....	John Georgeson.....	Feb. 8, 1900..	270 00
Yellow Island.....	John Doney.....	May 1, 1905..	735 00

APPENDIX

STATEMENT of Expenditure by the Marine Department

	1868.	1869.	1870.	1871.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Maintenance of Lights—				
Above Montreal	40,561 28	42,306 69	46,289 05	44,054 01
Montreal District	23,053 56	25,762 54	21,669 49	22,453 52
Below Quebec	45,615 35	41,651 73	43,730 61	31,582 75
Nova Scotia	46,400 72	56,394 88	43,682 86	76,230 77
New Brunswick	20,488 06	23,893 00	27,485 14	20,542 29
Prince Edward Island				
British Columbia				
Construction—				
Above Montreal	3,136 15		2,976 83	8,770 55
Quebec	7,323 75	7,492 59	1,543 06	
Nova Scotia	22,041 42	6,905 80	18,967 23	10,948 31
New Brunswick			11,555 91	8,735 73
Prince Edward Island				
British Columbia				
Dominion steamers—				
Quebec	69,026 73	37,176 02	34,549 49	59,797 05
Nova Scotia	14,778 92	26,603 94	19,759 96	13,139 86
New Brunswick				
Prince Edward Island				
British Columbia				
Examination of masters and mates			908 12	1,407 66
Hudson Bay expedition			140 00	
Investigation into wrecks				
Marine Hospital, Quebec	19,977 36	19,221 45	21,618 73	19,823 18
Marine hospitals	1,070 86	15,615 71	15,652 62	15,728 93
Meteorological service	8,200 00	8,950 00	8,950 00	9,370 82
Registration of Canadian shipping				
Removal of obstructions			2,350 07	1,000 00
Rewards for saving life				
Signal service				
Steamboat inspection	7,106 93	7,999 00	7,396 96	8,321 00
Survey, Georgian Bay				
Water police, Montreal				
" Quebec	27,445 35	10,238 71	9,323 31	8,030 00
Civil Government		12,633 59	9,038 62	9,379 73
Steam communication—	15,083 88	18,064 25	19,401 05	20,220 96
Between Quebec and Maritime Provinces				
Between Prince Edward Island and mainland				
Purchase of steamers to replace—				
Glendon				
Lady Head				
Winter mail service, Prince Edward Island				
Tidal observations				
Gratuities				
Survey, Burrard Inlet				
Export cattle trade				
	371,070 56	360,899 90	36,212 91	389,537 12

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No. 11.

from Confederation to March 31, 1909.

1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
57,609 16	61,036 47	60,798 75	71,937 18	68,344 18	65,421 00	73,175 11	74,587 78	65,518 61
22,939 00	31,143 14	26,333 13	15,000 00	12,200 48	15,898 00	15,906 00	14,917 95	16,523 88
41,936 00	65,645 00	102,066 00	116,362 00	98,792 93	82,980 41	96,904 00	93,178 61	96,703 87
67,806 24	109,953 89	114,711 91	114,344 51	143,125 56	128,496 00	132,888 95	120,951 33	116,189 60
23,369 12	29,266 85	53,493 04	60,119 02	62,551 61	50,298 00	58,982 00	57,409 92	61,252 82
		3,357 71	12,564 04	13,789 53	11,817 00	16,986 66	12,158 72	15,288 17
	13,207 09	18,519 50	15,983 72	17,175 97	15,853 00	18,848 78	15,152 73	15,576 99
6,940 45	18,999 38	24,461 86	14,286 65	13,320 40	16,267 98	7,207 95	11,993 75	13,297 81
57,818 35	39,303 87	41,250 82	19,325 00	24,336 47	12,945 29	12,776 47	4,154 58	7,797 75
34,760 12	90,181 79	51,867 94	43,898 68	42,214 55	25,550 00	13,500 00	17,386 97	7,069 01
9,561 14	16,691 06	31,572 60	8,842 97	17,819 85	7,083 82	12,028 13	22,598 14	4,985 53
				11,829 61	17,752 00	2,504 47	2,560 88	6,074 50
		4,353 93	8,799 07	8,477 67	29 66			
47,500 00	51,758 05	64,490 00	79,043 70	62,971 49	49,987 66	42,683 00	44,972 79	49,318 93
20,000 63	24,900 57	30,008 99	22,992 62	133,826 98	38,739 39	43,027 00	42,016 53	49,438 93
				16,241 26	61,782 63	28,933 63	16,332 05	14,429 52
12,115 96	15,984 72	10,555 67	41,796 74	10,156 56	16,095 90	12,193 49	7,460 68	9,733 34
4,312 07	6,466 18	4,520 12	5,626 62	4,672 08	4,060 00	4,249 76	4,250 12	4,233 43
874 00	1,068 89	2,813 31	366 00	466 41	342 65	500 00	1,691 00	676 73
21,000 00	21,000 00	20,456 45	21,994 75	23,795 85	19,965 97	19,987 50	20,791 77	12,991 23
53,536 16	27,150 43	45,986 87	37,111 67	37,155 72	42,449 53	37,487 10	37,445 57	35,040 00
12,618 15	18,830 54	36,706 59	33,580 00	45,569 93	44,871 38	46,050 24	43,706 13	45,554 51
		272 30	1,096 46	412 06	842 14	1,435 10	239 26	257 75
			450 00		203 00	462 00	305 86	825 00
2,284 32	1,975 13	4,931 78	3,552 86	2,292 20	1,958 55	4,071 00	2,533 10	2,263 15
		1,000 00						
8,500 00	13,266 00	10,291 68	12,200 00	13,681 86	13,073 01	13,228 38	13,076 46	11,854 34
19,000 00	14,453 87	12,370 86	13,395 00	14,000 00	13,524 29	14,062 00	13,462 74	13,131 06
10,348 00	18,299 00	26,326 66	24,509 00	27,136 68	21,482 68	23,498 66	23,023 26	22,094 48
22,644 32	23,336 04	30,087 23	31,328 19	32,789 18	32,304 12	32,682 05	36,610 19	35,033 95
		15,000 00	10,000 00	10,000 00				
				766 00				
518,908 49	706,817 92	843,150 00	844,586 08	970,146 27	820,054 38	786,156 23	755,359 47	723,890 89

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STATEMENT of Expenditure by the Marine Department

	1881.	1882.	1883.
	\$ cts.	\$ cts.	\$ cts.
Maintenance of lights			
Above Montreal	65,541 21	71,048 50	70,116 68
Montreal District	14,326 36	21,643 05	22,260 32
Below Quebec	89,781 29	91,098 66	102,784 99
Nova Scotia	128,918 59	137,846 15	150,793 17
New Brunswick	63,921 90	66,073 00	75,946 92
Prince Edward Island	12,997 36	16,385 72	17,907 27
British Columbia	17,570 72	17,803 00	18,349 06
Cape Race			
Construction—			
Above Montreal	14,180 02	13,581 00	9,782 27
Quebec	7,539 76	3,731 31	9,672 55
Nova Scotia	7,757 52	13,355 00	9,422 70
New Brunswick	4,578 52	2,253 80	1,022 57
Prince Edward Island	8,150 06	3,092 00	1,934 49
British Columbia	8,635 39	3,237 90	1,005 26
Queen's Printer			
Dominion steamers—			
Quebec	64,973 00	44,923 98	45,156 13
Nova Scotia	36,700 00	31,049 74	37,841 07
New Brunswick			
Prince Edward Island	15,139 95	23,911 97	19,680 00
British Columbia	11,788 09	8,504 61	25,484 00
Department			
Examination of masters and mates	3,888 41	3,981 00	4,021 20
Hudson's Bay expedition			
Investigation into wrecks	310 48	863 19	875 64
Marine Hospital, Quebec	19,964 33	19,938 12	19,998 53
Marine hospitals	32,218 94	33,162 45	29,880 78
Meteorological service	46,163 54	47,464 07	51,990 25
Registration of Canadian shipping	607 43	2,013 28	158 84
Removal of obstruction	150 00	1,116 51	35 80
Rewards for saving life	1,806 13	2,212 00	2,534 00
Signal service			3,365 33
Steamboat inspection	12,211 65	14,835 00	16,209 00
Hydrographic surveys			77 81
Water Police, Montreal	21,953 26	21,994 74	15,798 24
Water Police, Quebec	13,497 81	20,221 82	22,520 41
Civil Governemnt	36,447 50	36,789 46	37,988 39
Steam communication—			
Between Quebec and Maritime Provinces			
Between Prince Edward Island and mainland			
Repairs to wharfs			
Purchase of steamers to replace—			
Stanley			399 55
Glendon			
Lady Head			
Winter mail service, Prince Edward Island			
Tidal observations			
Gratuities			
Survey, Burrard Inlet			
Export cattle trade			
Survey, Bay of Quinté			
Relief of distressed Canadians			
Manning ships			
Widow of late A. Warren			
McDonald Bros.			
Parliamentary returns			
Investigating effect of Chicago drainage canal			
John McDonald			
Longitude, Montreal			
Marine biological station			
	761,730 62	774,831 53	825,010 82

SESSIONAL PAPER No. 21

from Confederation to March 31, 1909—*Continued.*

1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
70,788 27	70,697 89	85,713 98	75,690 74	85,588 70	72,721 23	84,035 65	93,180 72
22,946 43	23,262 94	33,239 28	16,735 49	17,510 17	12,285 79	118,750 70	122,741 89
101,302 35	118,856 94	131,095 29	131,540 80	108,278 67	112,690 20		
142,909 72	137,439 40	143,153 24	117,708 53	133,009 92	140,197 15	139,459 56	139,916 83
86,670 70	92,130 28	76,046 63	96,425 28	73,465 49	78,285 79	61,608 91	61,089 31
19,050 92	20,218 83	22,282 52	17,852 13	14,796 62	19,118 51	16,968 80	19,000 46
18,107 54	15,497 76	15,783 75	16,230 43	19,604 63	16,877 12	16,411 49	19,595 22
			4,453 25	5,124 20	7,358 01		
18,432 63	27,977 42	36,678 16	18,383 20	6,341 97	8,623 76		9,796 28
3,168 48	4,354 87	5,877 84	1,260 00	2,287 86	12,203 06		3,723 14
12,489 35	4,352 42	5,905 17	5,330 89	5,533 43	6,039 91		4,596 94
2,868 70	7,667 42	2,421 66	5,280 75	1,542 61	2,966 36	23,863 09	208 16
2,158 60	879 40		384 60				410 00
2,830 38	5,223 11	4,942 70	321 84	5,918 00	1,890 00		14,417 25
			26 58		40 14		
43,019 13	51,092 98	51,485 03	50,714 52				
27,726 60	42,921 27	30,283 27	32,287 10				
		24,633 26	14,337 23				
19,539 52	33,962 54	20,927 58	19,987 67	150,659 19	126,629 33	114,956 20	111,437 03
16,111 83	12,485 07	13,430 69	10,809 07				
			13,288 83				
5,580 79	6,656 44	5,239 28	4,858 98	5,063 96	4,381 04	4,177 83	4,255 24
480 69	71,374 69	35,217 10	14,762 61	165 00			
830 12	385 15	592 63	520 14	513 91	516 67	888 94	1,172 77
19,990 34	19,996 68	16,047 95	19,706 96	18,777 62	18,643 14	10,279 08	751 75
31,401 30	45,371 29	32,229 02	32,515 35	30,667 67	33,089 20	31,450 03	33,303 37
56,418 16	56,625 40	56,898 33	57,140 74	59,986 10	58,577 07	58,452 10	62,457 10
189 27	237 88	157 13	233 13	897 02	179 21	647 52	1,207 07
342 76	2,259 21	1,237 34	4,190 83	2,500 94	3,603 65	5,737 26	3,633 65
2,614 91	5,221 15	8,147 22	7,363 94	6,825 48	5,503 44	8,150 92	4,952 20
6,704 17	3,881 05	4,622 00	5,082 17	4,441 59	5,092 54	4,976 80	4,700 79
21,893 28	23,235 04	21,775 57	22,847 57	21,430 45	22,213 03	20,989 52	22,183 76
26,745 54	20,454 68	17,759 36	21,592 55	19,424 14	17,808 46	17,969 23	17,677 51
19,021 93	17,683 59	20,933 75	17,413 47	18,725 95	16,948 82	13,164 00	573 80
22,958 79	20,399 33	22,922 82	22,935 65	18,553 57	14,698 68	8,620 61	7,279 85
38,775 00	29,900 83	30,453 57	37,193 62	32,728 78	43,501 96	42,835 78	42,253 67
					133,505 60		
56,164 71	47,228 03						
		5,985 42	6,312 93				
				7,740 25	1,842 47	2,752 67	7,012 70
						244 75	1,888 71
					200 00	80 00	1,025 00
							1,690 12
							520 85

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STATEMENT of Expenditure by the Marine Department

	1892.	1893.	1894.	1895.	1896.	1897.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Maintenance of lights—						
Above Montreal.....	87,033 61	87,598 15	78,090 69	82,541 16	82,256 28	80,961 06
Montreal District.....						
Below Quebec.....	116,531 27	120,404 19	124,348 80	124,763 81	124,143 66	126,186 00
Nova Scotia.....	148,815 26	150,445 26	137,339 73	140,977 53	123,234 65	124,671 19
New Brunswick.....	66,886 69	71,079 46	59,917 96	69,654 46	63,018 64	56,871 02
Prince Edward Island..	17,069 98	16,819 64	15,569 39	17,976 67	17,988 15	16,429 23
British Columbia.....	26,858 68	24,413 27	27,240 77	21,734 18	24,770 44	25,679 52
General Account.....						
Construction—						
Above Montreal.....	21,704 05	8,766 62	12,581 15	2,699 40	11,993 84	9,527 94
Quebec.....	809 27	10,097 18	4,743 13	3,004 14	3,300 30	296 26
Nova Scotia.....	1,965 16	4,381 24	3,104 77	4,737 03	1,842 94	61 71
New Brunswick.....	1,845 35	1,271 15	115 45	1,597 80	200 00	1 60
Prince Edward Island..	1 56	2,958 61	1,604 00			452 90
British Columbia.....	9,478 81		6,356 43	180 83	225 50	569 99
Lake St. Peter.....						
New Dredge.....						
Dominion Steamers—						
Quebec.....						
Nova Scotia.....						
New Brunswick.....	145,899 61	163,097 46	178,183 97	169,661 64	145,315 28	136,940 11
Prince Edward Island..						
British Columbia.....						
Naval Schools.....						
Examinations of masters						
and mates.....	6,363 88	4,116 99	3,745 33	2,757 29	4,062 82	3,536 29
Hudson's Bay expedition..						19,091 32
Investigation into wrecks..	603 21	643 49	850 81	351 15	483 98	565 25
Lighthouse depot, Georgian Bay.....						
Marine Hospitals.....	34,106 83	35,757 07	38,403 94	38,589 05	36,632 96	37,984 71
Meteorological service.....	67,138 06	64,165 60	66,440 96	64,588 34	66,600 29	67,397 71
Registration of Can. ship-						
ping.....	462 59	1,476 19	394 00	207 40	517 60	531 55
Removal of obstructions...	2,878 68	1,554 53	202 02	2,217 36	456 38	631 86
Rewards for saving life...	6,398 93	7,432 64	8,014 67	6,591 34	8,004 38	5,955 19
Signal service.....	5,014 42	5,040 58	4,668 93	5,311 54	5,338 76	5,986 12
Steamboat inspection.....	22,736 59	24,386 95	25,961 36	26,385 88	26,321 27	26,837 83
Hydrographic surveys.....	16,451 10	17,542 11	31,461 76	12,653 28	15,099 63	12,352 99
Ship channel.....	6,161 60	5,436 23				
Civil Government.....	43,195 31	56,477 23	54,988 88	71,373 82		74,801 37
Repairs to wharfs.....		84 90	1,007 67	824 38	2,644 69	1,795 56
Purchase of steamer <i>Minto</i>						
Winter mail service, P.E.I.	3,309 44	4,376 96	6,497 03	6,138 18	7,779 69	21,931 05
Tidal observations.....	711 59	5,099 17	10,172 61	11,507 24	9,627 45	13,166 20
Gratuities.....			3,261 32			
Survey, Burrard Inlet.....	2,580 45					
Export cattle trade.....	1,411 57	1,711 73	1,350 83	2,268 74	2,887 24	
Survey, Bay of Quinté.....		2,085 45				
Relief of distressed Cana-						
dians.....				7 30		
Parliamentary returns.....					291 08	
Investigation effect Chica-						
go grain canal.....					2,500 00	
John MacDonald.....					200 00	
Unforeseen expenses.....						
Marine biological station..						
New life-saving station,						
Long Point.....						
Salaries, temporary clerks..						
Steamer to replace <i>Bayfield</i>						
Observatory, Sulphur Mtn.						
Charles Morrison.....						
Montreal Pilotage Commis-						
sioners.....						
Montreal wireless tele-						
graphy.....						
Purchase land for wharf at						
Halifax, N.S.						

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from Confederation to March 31, 1909—Continued.

1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
\$7,841 22	92,751 23	82,810 92	93,708 16	92,195 52	117,896 37	154,194 26	244,960 38
116,279 88	136,134 79	122,112 42	132,147 88	154,839 06	148,302 34	170,554 10	273,865 74
126,346 00	65,072 35	122,414 86	142,359 01	149,572 14	142,725 69	164,359 92	204,157 27
67,369 98	128,674 15	52,491 93	65,247 80	69,133 51	73,410 65	79,464 50	121,289 44
18,112 93	20,569 81	42,878 40	25,031 85	24,223 73	25,575 33	25,603 09	36,760 32
26,862 03	29,539 20	33,545 95	31,938 25	35,119 03	35,758 43	39,068 34	55,976 59
				46 75			
6,867 69	3,729 62	7,094 64	12,499 99				
3,640 90	37,838 80	40,319 03	17,060 13				
4,067 99	3,123 16	4,884 22	12,832 69				
1,423 34	91 49		266 34	158,714 09	399,487 73	540,675 07	1,447,202 77
1,409 60	616 96	5,586 91	922 00				
6,414 19	19,305 60		4,160 74				
			660 03				93,938 90
							10,745 36
117,644 39	145,270 75	180,430 65	195,484 75	452,526 92	369,813 97	306,171 01	475,907 20
						6,106 54	3,123 24
3,335 40	3,568 26	3,750 69	3,730 25	3,305 59	4,968 36	7,761 17	5,884 74
27,050 66						178,638 94	236,469 00
312 77	982 17	773 06	1,022 65	1,824 55	1,867 45	3,570 28	5,111 34
							12,000 00
38,162 56	37,353 29	37,743 30	36,008 75	51,827 13	48,750 15	50,301 78	51,731 56
64,135 71	73,148 05	76,692 42	74,082 76	80,147 46	87,293 00	90,306 99	98,820 21
818 33	966 48	266 43	546 62	607 23	417 25	1,203 56	1,215 14
704 17	745 49	252 19	1,000 00	1,325 25	382 98	752 60	9,521 68
5,081 40	7,049 09	7,007 97	8,519 92	8,278 55	9,306 25	11,763 12	9,592 91
4,993 88	6,067 90	5,906 83	8,950 17	6,452 56	6,863 75	7,740 01	8,755 44
26,342 29	28,935 49	72,965 72	29,247 59	27,493 80	30,172 09	33,723 12	50,187 75
15,306 66	13,664 97	12,600 98	16,170 20	25,488 64	35,243 97	41,366 95	103,926 98
							511,171 41
74,644 05	72,833 97	63,331 61	68,776 95	70,246 32	84,442 53	91,985 07	102,735 31
1,618 97		697 87	1,261 06	2,824 28	1,721 91	1,300 89	1,590 61
	144,365 29	41,951 88					
9,575 31	8,439 70	1,503 70	2,093 93	8,835 86	6,211 28	8,912 57	10,984 74
3,981 45	5,186 35	4,372 18	7,060 20	8,925 33	14,520 00	21,871 71	23,802 24
				136 85	1,050 00	1,210 00	2,340 00
2,499 80	2,737 85	2,762 24	2,746 84	3,321 23	3,026 25	3,504 43	3,300 35
			133 32		95 10		269 20
			1,659 14				
		3,452 21	2,630 62	3,490 29	4,822 78	3,977 63	2,953 19
	5,709 10	739 61	1,990 58	1,998 85	2,600 00	2,996 54	2,001 69
				1,780 52			
				2,967 35	6,945 96	11,448 10	15,881 35
				50,000 00			
				55 00	3,167 62		
				223 00			
				3,691 69			
					1,745 23	2,050 00	10,776 51
					3,528 25	18,847 31	40,785 1

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STATEMENT of Expenditure by the Marine Department

	1892.	1893.	1894.	1895.	1896.	1897.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Purchase land for wharf at Charlottetown, P. E. I.						
Schools for navigation.						
Naval militia.						
Cattle inspection.						
Wrecking plant.						
Ice-breaking steamers.						
S. Shaw.						
Salaries, lightkeepers.						
Agencies, rents, &c.						
Maintenance and repairs.						
Repairs to lightships.						
Construction and apparatus						
	961,426 86	898,720 03	905,654 34	895,828 28	793,634 49	867,772 90

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from Confederation to March 31, 1909—*Continued.*

1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.
\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
						15,119 11	
						13,000 00	
						5,036 29	
						9,135 87	
						3,335 52	
						25,000 00	
						164,414 93	
						39 33	
						242,403 64	
						29,739 50	
						531,920 43	
						23,560 00	
						1,605,718 59	
856,192 50	1,102,601 90	982,561 97	1,029,925 32	1,501,618 88	1,671,494 77	2,150,940 31	4,747,722 81

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STATEMENT of Expenditure by Marine Department from Confederation to March 31,
1909—Continued.

	1906.
	\$ cts.
Dominion steamers—	
Quebec.....	
Nova Scotia.....	
New Brunswick.....	
Prince Edward Island.....	
British Columbia.....	587,885 89
Examination of masters and mates.....	7,068 15
Hudson's Bay expedition.....	132,707 52
Investigation into wrecks.....	7,476 07
Marine hospitals.....	50,120 42
Meteorological service.....	99,719 52
Registration of Canadian shipping.....	1,800 00
Removal of obstructions.....	4,967 15
Rewards for saving life.....	11,991 43
Signal service.....	8,194 39
Steamboat inspection.....	37,590 22
Hydrographic surveys.....	120,359 68
Ship channel.....	587,957 51
Repairs to wharfs.....	2,960 47
Winter mail service, Prince Edward Island.....	16,680 58
Tidal observations.....	28,047 77
Unforeseen expenses.....	3,765 17
Marine biological station.....	2,914 03
Salaries, temporary clerks.....	19,947 01
Purchase land for wharf at Halifax, N. S.....	88,032 87
Schools for navigation.....	5,036 29
Naval militia.....	9,135 87
Cattle inspection.....	3,335 52
Wrecking plant.....	25,000 00
Ice-breaking steamers.....	161,414 93
S. Shaw.....	39 23
Salaries, lightkeepers.....	242,403 64
Agencies, rents, &c.....	29,739 50
Maintenance and repairs.....	531,920 43
Repairs to lightships.....	23,560 00
Construction and apparatus.....	1,605,778 59
Submarine signal apparatus.....	50,547 60
Administration of pilotage.....	12,066 42
Parry Sound Buoy Depot.....	11,711 17
Compensation <i>re</i> explosion of gas buoys.....	38,686 49
Water system, Partridge Island.....	2,957 37
Observatory, Toronto.....	2,872 96
" Montreal.....	500 00
Hydrographic steamer, <i>Atlantic coast</i>	45,500 00
" " <i>Pacific coast</i>	370 01
New dredge No. 15.....	150,001 32
" <i>Galveston</i>	159,847 89
Shipwrecked and distressed seamen.....	598 81
Parliamentary returns.....	485 11
Gratuities.....	616 66
Civil Government, salaries.....	88,453 31
" " contingencies.....	19,506 45
	5,066,252 66

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STATEMENT of Expenditure by Marine Department from Confederation to March 31,
1909—Continued.

Service.	Amount.	Total. 1907.
	\$ cts.	\$ cts.
Ocean and river—		
Dominion steamers.....	447,139 03	
Examination of masters and mates.....	5,934 16	
Rewards for saving life—life-boats, &c.....	9,025 89	
Investigations into wrecks.....	8,662 16	
Schools for navigation.....	4,891 69	
Registration of Canadian shipping.....	1,506 53	
Removal of obstructions in navigable waters.....	7,377 20	
Tidal service.....	19,214 79	
Winter mail service.....	11,998 01	
Marine biological stations.....	1,537 04	
Cattle inspection.....	2,743 80	
Wrecking plant.....	15,000 00	
Hudson's Bay expedition.....	33,871 95	
" " patrol boat.....	29,977 91	
Ice-breaking steamer <i>Lady Grey</i>	66,293 51	
Quebec Coal Company's claim.....	1,000 00	
Arresting two sailors of the <i>Hector</i>	148 75	
H. M. Stewart, clothing destroyed by fire.....	171 00	
Unforeseen expenses.....	3,213 62	669,717 04
Lighthouse and coast—		
Salaries and allowances of lightkeepers.....	197,235 03	
Agencies, rents and contingencies.....	22,076 58	
Maintenance and repairs to lighthouses.....	499,597 86	
Construction of lighthouses and apparatus.....	1,159,906 40	
Breaking ice in Thunder Bay.....	21,303 85	
Signal service.....	6,859 68	
Marconi stations.....	53,532 19	
Pilotage.....	21,490 73	
Repairs to wharfs.....	1,747 15	
Salaries, temporary clerks.....	14,477 16	
Georgian bay and Parry Sound buoys.....	4,500 43	2,002,727 06
Scientific institutions and hydrographic surveys—		
Observatory, Toronto.....	2,313 67	
" Kingston.....	375 00	
" Montreal.....	375 00	
Meteorological service.....	75,163 20	
Hydrographic surveys.....	84,435 32	161,662 19
Dredge No. 15.....		150,000 00
Cap à la Roche.....		1,347 87
Galveston.....		50,089 77
Ship channel.....		419,398 19
Compensation to L. O'Brien.....		2,200 00
Marine hospitals.....	37,362 11	
Shipwrecked and distressed seamen.....	793 56	38,156 67
Steamboat inspection.....	634 36	32,459 55
Returns for Parliament.....	25,000 00	
K. Falconer, reorganizing system of bookkeeping.....		25,634 36
Civil Government, Salaries.....	68,995 81	
" " Contingencies.....	14,182 31	83,178 12
Total, Marine Branch.....		3,637,569 82
" Fisheries Branch.....		534,669 90
Fishing bounty.....		159,015 75
		4,331,255 47

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STATEMENT of Expenditure by Marine Department from Confederation to March 31,
1909—*Continued.*

EXPENDITURE for the fiscal year ended March 31, 1909.

	Amount.	Total, 1908.
<i>Ocean and River Service—</i>		
Dominion steamers and ice-breakers.	\$669,428 59	
Examination of masters and mates.	11,508 31	
Rewards for saving life.	31,642 41	
Investigations into wrecks.	6,543 08	
Schools of navigation.	7,378 07	
Registration of shipping.	1,982 70	
Removal of obstructions.	26,009 59	
Tidal service.	30,977 40	
Winter mail service.	11,019 79	
Cattle inspection.	3,503 90	
Wrecking plants.	30,000 00	
Unforeseen expenses.	1,301 61	
Naval militia.	9,078 17	
Patrolling waters in northern portion of Canada.	34,706 39	
New ice-breaking steamer.	5,974 61	
Returns to Parliament.		
		\$881,054 56
<i>Public Works—Chargeable to Capital—</i>		
Ship channel.	\$761,916 84	
Permanent piers in Lake St. Peter, &c..	116,063 87	
Dredging, Cap à la Roche.	75,000 00	
Dredge <i>Beaujeu</i>	100,000 00	
Spur line, Sorel shipyard.	8,815 05	
Montreal and Quebec Signal Service. . . .	12,232 15	
		\$1,074,027 91
<i>Lighthouse and Coast Service—</i>		
Agencies, rents and contingencies.	\$ 29,359 26	
Salaries and allowances to lightkeepers ..	285,050 14	
Maintenance and repairs to lighthouses..	689,319 86	
Parry Sound buoy depot.	41,983 93	
Construction of lighthouses, &c.. . . .	715,572 91	
Construction of apparatus	801,636 83	
Wireless stations.	114,986 60	
Signal service.	9,350 28	
Administration of pilotage.	31,087 22	
Maintenance and repairs to wharfs, &c ..	1,456 86	
Maintenance and upkeep of dock yards..	30,656 22	
Breaking ice, Lake Superior, &c.. . . .	37,053 32	
Salaries of temporary clerks, &c.. . . .	16,728 99	
Telephone reporting stations below Mon- treal.	7,820 68	
Steamer for the Great Lakes.		
Service of expert accountants.	13,066 34	
Charter of steamer, Lime Kiln Crossing..	6,650 00	
Keeping lights on 'Castle' and 'Arminia'	3,680 00	
		2,835,459 44

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STATEMENT of Expenditure by Marine Department from Confederation to March 31,
1909—*Concluded*.EXPENDITURE for the Fiscal year ended March 31, 1909—*Concluded*.*Scientific Institutions and Hydrographic**Surveys—*

Meteorological service.. . . .	\$122,572 86	
Magnetic observatory.. . . .	2,918 20	
Montreal observatory.. . . .	500 00	
Kingston observatory.. . . .	500 00	
Hydrographic surveys.. . . .	115,631 31	
Hydrographic survey steamer for B.C..	107,250 00	
		\$349,373 37
Marine hospital.. . . .	\$ 59,957 92	
Shipwrecked and distressed seamen . . .	342 25	
Marine hospital at Yarmouth, N.S.. . . .	7,285 00	
		67,585 17
Steamboat inspection.. . . .	\$ 42,210 43	

<i>Fisheries</i>		800,081 73
Civil Government Salaries, Marine and		
Fisheries.. . . .	103,916 53	
Contingencies of Marine and Fisheries ..	21,146 77	
		125,063 30

Total expenditure Marine and Fisheries.. . . .	\$6,174,855 91
Fishing bounty.. . . .	156,114 50

Expenditure for 1908-9 is Appendix No. 5 in this report to be added to statement of expenditure since confederation.

APPENDIX No. 12.

LIVE STOCK SHIPMENTS SEASON 1908-9.

SHIPPED FROM MONTREAL.

Months.	Cattle.	Sheep.	Horses.	Hay.	Grain for Feed.	Men.	U. S. Cattle.
1908.				Lbs.	Lbs.		
May.....	9,312	305	29	2,449,150	756,180	372	
June	9,462	1,478	13	2,467,820	760,908	381	
July.....	15,886	1,485	3	4,634,870	758,880	629	
August.....	17,962	1,399	13	5,283,610	741,840	702	
September..	15,796	2,435	18	4,769,170	821,090	636	
October .	16,332	1,416	24	4,928,450	729,630	636	
November.....	15,080	1,593	16	4,727,910	590,760	598	
	99,830	10,111	116	29,260,980	5,159,360	3,954	10,398

United States cattle included in the total of 99,830.

FROM THE PORT OF ST. JOHN, N.B.

Months.	Cattle.	Sheep.	Horses.	Hay.	Grain for Feed.	Men.	U. S. Cattle.
1908.				Lbs.	Lbs.		
December.....	5,448		27	1,827,37	209,612	218	
1909.							
January.....	7,032	151		2,135,256	557,585	280	
February.....	2,729		12	798,340	212,272	111	
March.....	3,259			949,150	266,030	133	220
April.....	4,455		12	1,375,325	359,500	178	
	22,923	151	65	7,086,008	1,604,999	920	220

United States cattle included in the total of 22,923.

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FROM THE PORT OF HALIFAX, N.S.

Date.	Cattle.	Hay.	Grain for Feed.	Men.
1908.		Lbs.	Lbs.	
December.	1,119	347,671	46,420	44
1909.				
January.	1,536	520,870	122,376	62
February.	252	79,400	25,200	11
March.	74	20,000	6,100	3
April.	116	29,250	9,300	6
	3,097	997,191	209,396	126

DIFFERENT Ocean Lines by which the Live Stock was shipped during season 1908-9,
from Montreal.

Ocean Line.	Cattle.	Sheep.	Horses.
Allan Line.	14,656	.....	18
Dominion Line.	13,580	6,141	.....
Thompson Line.	15,117	.....	.....
Donaldson Line.	22,727	678	55
Canadian Pacific Steamship Co.	29,120	3,224	8
Furness Withy Line.	4,620	.....	.....
Elder Dempster Line. ....	.....	68	.....
	99,820	10,111	81

TOTAL shipments of Live Stock from Canada and Ports in Great Britain, &c., to
which the Live Stock was shipped.

London.	48,502	2,654	40
Liverpool.	39,336	7,389	10
Glasgow.	26,760	151	73
Manchester.	7,192	.....	.....
Bristol.	4,060	.....	.....
South Africa. ....	.....	68	.....
	125,850	10,262	123

COMPARATIVE STATEMENT of the number of Cattle shipped from Canada to British ports from the years 1902-3 to 1908-9.

	SHEEP.			CATTLE.			HORSES.			TOTALS.		
	Montreal.	St. John.	Halifax.	Montreal.	St. John.	Halifax.	Montreal.	St. John.	Halifax.	Sheep.	Cattle.	Horses.
1908-9.....	10,111	151	Nil.	99,830	22,923	3,097	116	65	Nil.	10,262	125,850	181
1907-8.....	11,585	4,168	"	96,977	20,210	Nil.	174	51	"	15,753	127,187	225
1906-7.....	10,791	1,371	"	128,160	31,148	"	661	57	"	12,162	159,308	718
1905-6.....	19,077	3,971	"	126,871	33,543	1,042	568	79	"	23,048	161,456	647
1904-5.....	49,422	17,293	"	108,553	33,833	745	279	213	"	66,715	143,131	492
1903-4.....	57,741	23,428	1,475	133,594	25,855	5,456	361	31	"	82,644	164,905	423
1902-3.....	61,017	19,310	426	147,201	37,453	3,856	373	115	17	80,753	188,510	503

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APPENDIX No. 13.

MARINE HOSPITALS AND PORTS AT WHICH SICK SEAMEN WERE TREATED.

GEORGE J. DESBARATS, Esq.,
Acting Deputy Minister of Marine and Fisheries,
Ottawa, Ont.

SIR,—I have the honour to submit the annual report of the transactions in the Marine Hospitals Service, for the fiscal year ended March 31, 1909.

I have the honour to be, sir,
Your obedient servant,

C. H. GODIN, M.D.,
Med. Supt. Marine Hospitals' Service.

MARINE HOSPITALS SERVICE.

EXPENDITURE FOR 1908-9.

Amount of appropriation. \$55,000 00
Amount of expenditure. 54,999 85
Balance. \$ 0 15

Province.	Number of Seamen.	Number of Days.	Total Expenditure.
			\$ cts.
Nova Scotia.	1,826	13,569	23,871 32
New Brunswick.	424	2,336	6,514 09
Prince Edward Island.	366	1,265	4,259 58
Quebec.	683	4,144	9,231 25
British Columbia.	485	5,177	9,363 92
General Account.			1,759 69
	3,784	26,491	54,999 85

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NOVA SCOTIA.

TABLE showing the Expenditure for each Port.

Port.	Number of Seamen.	Number of Days.	Total Expenditure.
			\$ cts.
Advocate.....	3	9	15 85
Amherst.....	13	49	179 25
Annapolis Royal.....	15	40	124 70
Apple River.....	2	35	64 00
Arichat.....	32	669	922 90
Baddeck.....	4		40 00
Barrington.....	21	91	372 00
Barton.....	9	162	400 17
Bear River.....	6	84	188 50
Belliveau's cove.....	3		5 00
Bridgewater.....	8		24 50
Canning.....	1	63	64 25
Canso.....	81	176	510 68
Chester.....	1	35	369 37
Cheverie.....	1	11	29 00
Cheticamp.....	20		69 50
Church Point.....	1	91	138 40
Clark's Harbour.....	47	365	560 75
Clementsport.....	5	101	162 34
D'Escousse.....	1	16	6 00
Digby.....	44	466	499 72
Economy.....	2	40	67 55
Freeport, Westport, Tiverton.....	43	1,590	863 29
Glace Bay.....	15	126	414 00
Guysborough.....	2		5 75
Halifax City Hospital.....	3	11	35 68
Halifax Victoria Hospital.....	146	3,020	4,188 40
Hantsport.....	1		2 00
Ingram Docks.....	7		31 75
Isaac's Harbour.....	3		7 75
La Have.....	5		158 75
Liscomb.....	6	126	466 50
Liverpool.....	11	368	272 50
Lockport.....	17	273	222 70
Louisburg.....	16	232	1,335 41
Lunenburg.....	40	1,198	1,258 57
Mahone Bay.....	17		54 95
Margaree.....	1		28 50
Margeret'sville.....	1		2 00
Meteghan.....	6	254	263 61
North East Harbour.....	2		65 00
North Port.....	6		18 60
North Sydney.....	232		539 65
Parsboro.....	88		302 45
Pictou.....	65	151	1,149 73
Point Tupper.....	4	49	286 01
Port Dufferin.....	3		30 50
Port Gréville.....	6	98	165 00
Port Hastings.....	20		54 75
Port Hood.....	1		2 50
Port Latour.....	14	21	147 75
Port Morien.....	22		125 00
Port Mulgrave.....	4		17 50
Port Wade.....	8	91	168 75
Pubnico.....	12		181 00
Pugwash.....	10		20 50
River Bourgeois.....	9		71 25
River Hebert.....	6		45 50
Salmon River.....	1	40	112 15
Sandy Cove.....	14	250	487 62
Sheet Harbour.....	3		10 00
Marble Mountain.....	1		3 00
Shelburne.....	3	23	73 50
Sherbrooke.....	3		42 75
Carried forward.....			18,547 00

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NOVA SCOTIA—*Concluded.*TABLE showing the Expenditure for each Port.—*Concluded.*

Port.	Number of Seamen.	Number of Days.	Total Expenditure.
			\$ cts.
Brought forward.....			18,547 00
Ship Harbour.....	1		5 00
Springhill.....	1	8	7 20
Stoney Island.....	1	59	17 70
St. Peters.....	24	14	201 00
Sydney.....	62	1,586	2,142 40
Tusket Wedge.....	1		17 00
Wallace.....	4		43 15
Weymouth.....	28	286	367 90
Windsor.....	22	45	117 25
Wolfville.....	2		2 00
Yarmouth.....	82	1,138	2,403 72
	1,826	13,569	23,871 32

NEW BRUNSWICK.

TABLE showing the Expenditure for each Port.

Port.	Number of Seamen.	Number of Days.	Total Expenditure
			\$ cts.
Boie Verte.....	1	5	7 50
Bathurst.....	4	51	289 69
Beaver Harbour.....	1		16 00
Buctouche.....	7		13 00
Cambellton.....	98		484 86
Cape Tormentine.....	7	17	147 75
Caraquet.....	5		10 75
Dalhousie.....	23	3	133 75
Dorchester.....	4		66 40
Douglastown.....	78	276	1,220 16
Grand Manan.....	7		68 10
Grand Harbour.....	9	117	313 22
Harvey.....	2		12 30
Hillsborough.....	10	108	352 80
Moncton.....	13		200 00
Point Wolfe.....	1		16 00
Richibucto.....	5		200 00
River Louison.....	8		42 00
St. Andrews.....	1		3 75
St. John.....	125	1,759	2,566 10
St. Martins.....	6		55 46
St. Stephens.....	1		86 50
Shediac.....	6		200 00
Shippegan.....	2		8 00
	424	2,336	6,514 09

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PRINCE EDWARD ISLAND.

TABLE showing the Expenditure for each Port.

Port.	Number of Seamen.	Number of Days.	Total Expenditure.
			\$ cts.
Alberton.....	6		13 95
Cardigan.....	2		22 65
Charlottetown Hospital.....	13	501	756 55
P.E.I. Hospital.....	10	469	679 30
Crapaud.....	3		11 25
Georgetown.....	15		69 05
Miminegash.....	6		84 75
Montague.....	16		26 35
Murray Harbour.....	37	7	545 20
Souris.....	177	288	1,128 58
Summerside.....	70		785 50
Tignish.....	10		130 45
Vernon River.....	1		6 00
	366	1,265	4,259 58

QUEBEC.

TABLE showing the Expenditure for each Port.

Port.	Number of Seamen.	Number of Days.	Total Expenditure.
			\$ cts.
Batiscan.....	5		40 00
Carleton.....	3		7 50
Chicoutimi.....	5	34	99 60
Frazerville.....	8	28	61 30
Gaspé.....	44	14	208 00
General Account.....			400 00
Grand River.....	2		5 75
Magdalen Islands.....	18	15	99 25
Matane.....	14	21	183 25
Montreal Alexandra Hospital.....	1	35	73 00
Montreal General Hospital.....	146	999	1,704 20
Montreal Notre Dame Hospital.....	158	2,048	3,011 50
Montreal Victoria Hospital.....	1	4	6 00
New Richmond.....	7	10	85 90
Pasbebiac.....	11		218 75
Percé.....	14		57 50
Port Daniel.....	5		20 50
Quebec Hotel Dieu.....	24	177	265 50
Quebec Jeffery Hale.....	53	647	961 50
Rimouski.....	19	8	80 75
St. Anne des Monts.....	4		52 80
St. Jean.....	103	18	807 70
St. Thomas de Montmagny.....	3	9	40 20
Seven Islands.....	1	21	310 00
Sorel.....	11		38 50
Three Rivers.....	23	47	392 30
	683	4,144	9,231 25

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BRITISH COLUMBIA.

TABLE showing the Expenditure for each Port.

Port.	Number of Seamen.	Number of Days.	Total Expenditure.
			\$ cts.
Chemainus.....	18	378	719 99
Nanaimo.....	226	191	845 50
Port Simpson.....	2	33	56 90
Union Bay.....	88	235	927 15
Vancouver, St. Paul's Hospital....	54	1,968	2,952 00
Victoria St. Joseph.....	4	114	179 00
Victoria Marine Hospital.....	93	2,258	3,683 38
	485	5,177	9,363 92

GENERAL ACCOUNT.

Superintendent's salary to 1st of September, 1908.. . . .	\$ 500 00
Superintendent's travelling expenses.. . . .	776 28
Doctor Grenfell's grant.. . . .	200 00
Printing.. . . .	204 16
Stationery.. . . .	77 55
Express charges.. . . .	1 70

\$1,759 69

N.B.—The superintendent's salary was charged to civil government after September 1, 1908.

TABLE SHOWING EXPENDITURE FOR TREATMENT, BOARD, SUPPLIES, ETC.

—	Nova Scotia.	New Brunswick.	Prince Edward Island.	Quebec.	British Columbia.	General Account.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Board in hospitals and private houses	8,528 09	2,760 57	1,607 57	6,222 30	5,607 05	
Medical and surgical treat- ment.....	6,262 30	947 31	2,328 55	988 20	621 15	
Medical officers and keep- ers' salaries	5,517 33	2,125 00	312 50	1,518 75	2,250 00	500 00
Fuel.....	796 28	96 05			214 50	
Supplies, drugs and instru- ments.....	1,483 60	187 73			361 20	281 71
Telephone.....	133 66	77 07			66 00	
Water.....	17 00				39 60	
Transportation.....	188 25	34 86	5 25	77 00	19 30	777 98
Repairs and maintenance..	781 94	1 00			15 85	
Special nursing	120 87		5 71	25 00	72 75	
Burials	42 00	16 25				
Miscellaneous.....		68 25				
Grants		200 00		400 00		200 00
Light.....					96 52	
Totals.....	23,871 32	6,514 09	4,259 58	9,231 25	9,363 92	1,759 69

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TABLE SHOWING AMOUNT OF SALARIES PAID TO MEDICAL OFFICERS
AND KEEPERS DURING 1908-09.

<i>Nova Scotia.</i>		<i>New Brunswick.</i>	
	\$ cts.		\$ cts.
Bear River—		Bathurst—	
Medical officer.....	150 00	Medical officer.....	150 00
Canso—		Campbellton—	
Medical officer.....	375 00	Medical officer..	350 00
Digby—		Douglastown—	
Medical officer.....	250 00	Medical officer..	525 00
Keeper	50 00	Keeper	250 00
Freeport—		Hillsboro—	
Medical officer.....	300 00	Medical officer.....	250 00
Liverpool—		Moncton—	
Medical officer..	100 00	Medical officer.....	200 00
Louisburg—		Richibucto—	
Medical officer.....	250 00	Medical officer.....	200 00
Keeper	350 00	Shediac—	
Lunenburg—		Medical officer..	200 00
Medical officer.....	287 50		
Keeper	150 00		2,125 00
North Sydney—			
Medical officer.....	400 00	<i>British Columbia.</i>	
Parrsboro—		Chemainus—	
Medical officer.....	300 00	Medical officer..	450 00
Pictou—		Nanaimo—	
Medical officer..	698 33	Medical officer.....	600 00
Keeper	200 00	Victoria—	
Point Tupper—		Medical officer.....	600 00
Medical officer..	100 00	Keeper	600 00
Keeper	144 00		2,250 00
Port Morien—			
Medical officer.....	125 00	<i>Quebec.</i>	
Sydney—		Gaspé—	
Medical officer.....	625 00	Medical officer.....	200 00
Keeper	300 00	Paspebiac—	
Yarmouth—		Medical officer..	218 75
Medical officer.....	362 50	St. Jean—	
	5,517 33	Medical officer..	750 00
		Three Rivers—	
<i>Prince Edward Island.</i>		Medical officer.....	350 00
Summerside—		General Account— Superintendent's	
Medical officer.....	312 50	salary up to Sept. 1, 1908.....	500 00
			2,018 75
		Total amount of salaries...	12,223 58

TABLE SHOWING EXPENDITURE FOR TREATMENT, COMPRISING DOCTORS'
SERVICES, DOCTORS' TRAVELLING EXPENSES, DRUGS AND BOARD.

NOVA SCOTIA.

Ports.	Doctors' Services.	Doctors' Travelling Expenses.	Drugs.	Board.	Total Expenses.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Advocate.....	9 00		3 00	3 85	15 85
Amherst.....	97 00	27 00	29 25	26 00	179 25
Annapolis.....	85 00		23 00	16 70	124 70
Apple River.....	11 00	35 00	3 00	15 00	65 00
Arichat.....	327 00	147 50	212 15	236 25	922 90
Barrington.....	150 00	159 00	24 00	39 00	372 00
Baddeck.....	14 00	18 00	8 00		40 00
Barton.....	134 50	93 00	39 85	69 42	336 77
Belliveau's Cove.....	3 00		2 00		5 00
Bridgewater.....	16 00		8 50		24 50

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TABLE SHOWING EXPENDITURE FOR TREATMENT, COMPRISING DOCTORS' SERVICES, DOCTORS' TRAVELLING EXPENSES, DRUGS AND BOARD.

NOVA SCOTIA—Continued.

Ports.	Doctors' Services.	Doctors' Travelling Expenses.	Drugs.	Board.	Total Expenses.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Canning.....	22 00		7 75	34 50	64 25
Chester.....	275 00		14 50	37 00	326 50
Canso.....				135 68	135 68
Cheverie.....	4 00	20 00		5 00	29 00
Chitecamp.....	57 50		12 00		69 50
Church Point.....	49 00	40 50	8 90	35 00	133 40
Clark's Harbour.....	225 00	126 75	96 40	112 60	560 75
Clementsport.....	37 00	73 00	6 05	46 29	162 34
Bear River.....				38 50	38 50
D'Escousse.....				6 00	6 00
Digby.....				199 72	199 72
Economy.....	17 00	17 00	12 55	21 00	67 55
Freeport, &c.....				553 29	553 29
Glace Bay.....	294 00		14 00	104 00	412 00
Guysborough.....	5 00		0 75		5 75
Halifax City Hospital.....	10 50	12 00		10 68	33 18
Halifax Victoria General.....				4,110 90	4,110 90
Hantsport.....	1 00		1 00		2 00
Ingram Docks.....	8 00	21 00	2 75		31 75
Isaac's Harbour.....	6 00	0 50	1 25		7 75
La Have.....	39 00	100 50	19 25		158 75
Liscomb.....	50 00	330 00	32 50	54 00	466 50
Lockeport.....	94 75		19 25	105 70	219 70
Liverpool.....				172 50	172 50
Louisburg.....				99 08	99 08
Lunenburg.....				516 63	516 63
Mahone Bay.....	56 00		18 95		54 95
Marble Mountain.....	3 00				3 00
Margaree.....	15 00	7 50	6 00		28 50
Margaretsville.....	1 00		1 00		2 00
Meteghan.....	122 00	9 40	38 60	91 61	261 61
North East Harbour.....	31 00	18 00	16 00		65 00
Northport.....	11 00		7 60		18 60
North Sydney.....			67 65		67 65
Pictou.....				65 63	65 63
Port Dufferin.....	5 00	25 00	0 50		30 50
Port Gréville.....	76 00	22 00	21 50	45 50	165 00
Port Hastings.....	21 00	13 00	20 75		54 75
Port Hood.....	1 00	0 50	1 00		2 50
Port Latour.....	62 00	70 25	3 50	12 00	147 75
Port Mulgrave.....	10 00		7 50		17 50
Port Wade.....	16 00	88 00	24 25	40 50	168 75
Point Tupper.....				21 01	21 01
Pubnico.....	70 00	85 00	26 00		181 00
Pugwash.....	12 00		8 50		20 50
River Bourgeois.....	18 00	40 00	13 25		71 25
River Hebert.....	23 00	14 00	8 50		45 50
Salmon River.....	18 00	72 03	5 00	17 15	112 15
Sandy Cove.....	213 75	130 00	51 60	92 27	487 62
Sheet Harbour.....	4 00	1 00	5 00		10 00
Shelburne.....	48 00	3 50	4 00	10 00	65 50
Sherbrooke.....	13 00	17 50	12 25		42 75
Ship Harbour.....	3 00		2 00		5 00
St. Peters.....	49 00	103 50	40 50	6 00	199 00
Sydney.....				675 44	675 44
Tusket Wedge.....	8 00	6 00	3 00		17 00
Wallace.....	19 00	15 00	9 15		43 15
Weymouth.....	124 00	46 75	59 70	109 60	340 05
Windsor.....	63 00		29 75	24 50	117 25
Wolfville.....	1 00		1 00		2 00
Yarmouth.....				487 69	487 69
Springhill.....				7 20	7 20
Stony Island.....				17 70	17 70
	3,133 00	2,008 65	1,115 65	8,528 09	14,790 39

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TABLE showing expenditure for the treatment comprising Doctor's services, Doctors' travelling expenses, Drugs and Board.

NEW BRUNSWICK.

Ports.	Doctors' Services.	Doctors' Travelling Expenses.	Drugs.	Board.	Total Expenses.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Baie Verte	5 00			2 50	7 50
Bathurst				36 42	36 42
Beaver Harbour	2 00	10 00	4 00		16 00
Buctouche	9 00		4 00		13 00
Campbellton	100 00				100 00
Cape Tormentine	63 00	40 00	19 25	25 50	147 75
Caraget	4 50	1 00	5 25		10 75
Dalhousie	72 00	1 50	41 80	6 20	121 50
Dorchester	56 00	5 00	5 40		66 40
Douglastown				118 33	118 33
Grand Manan	40 00	13 00	15 10		68 10
Grand Harbour	105 00	72 00	29 50	106 72	313 22
Harvey	4 00	4 00	4 30		12 30
Hillsboro				102 80	102 80
Point Wolfe	1 00	14 00	1 00		16 75
River Louison	11 50	29 00	1 50		42 00
St. Andrews	3 00		75		3 75
St. Stephens	51 00	25 00	10 50		86 50
St. John				2,362 10	2,362 10
St. Martins	24 00	25 00	6 46		55 46
Shippegan	2 00		6 00		8 00
	553 00	239 50	154 81	2,760 57	3,707 88

PRINCE EDWARD ISLAND.

Ports.	Doctors' Services.	Doctors' Travelling Expenses.	Drugs.	Board.	Total Expenses.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Alberton	7 00		6 95		13 95
Cardigan	15 00		7 65		22 75
Charlottetown Hospital				754 05	754 05
Prince Edward Island Hospital				679 30	679 30
Crapaud	8 00	50	2 75		11 25
Georgetown	33 00	4 00	32 05		69 05
Miminegash	22 00	41 00	21 75		84 75
Murray Harbour	272 00	124 00	146 20	3 00	545 20
Souris	605 00		343 90	171 22	1,120 12
Summerside	473 00				473 00
Tignish	87 00	4 00	39 45		130 45
Vernon River	4 00		2 00		6 00
Montague	18 00		8 35		26 35
	1,544 00	173 50	611 05	1,607 57	4,136 12

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TABLE showing Expenditure for treatment, comprising Doctors' services, Doctors' travelling expenses, Drugs and Board.

QUEBEC.

Ports.	Doctors' Services.	Doctors' Travelling Expenses.	Drugs.	Board.	Total Expenses.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Batiscan.....	29 00		11 00		40 00
Carleton.....	3 00		4 50		7 50
Chicoutimi.....	27 00		21 00	51 60	99 60
Fraserville.....	20 00	3 50	9 80	28 00	61 30
Gaspé.....				8 00	8 00
Grand River.....	5 00		75		5 75
Magdalen Islands.....	28 00	33 00	25 50	11 25	97 75
Matane.....	128 00	6 00	17 75	31 50	183 25
Montreal Alexandra.....				70 00	70 00
Montreal General.....				1,660 20	1,660 20
Notre-Dame Hospital.....				2,985 00	2,985 00
Victoria Hospital, Montreal.....				4 00	4 00
New Richmond.....	24 00	20 00	31 90	10 00	85 90
Quebec Hotel-Dieu.....				265 50	265 50
Jeffery Hale, Quebec.....				961 50	961 50
Rimouski.....	35 75	17 00	24 50	3 50	80 75
Port Daniels.....	7 00	3 00	10 50		20 50
Percé.....	23 00	14 00	20 50		57 50
Ste. Anne Des Monts.....	9 00	31 00	12 80		52 80
St. Jean.....				57 70	57 70
St. Thomas de Montmagny.....	27 00		5 95	7 25	40 20
Seven Islands.....	109 00	151 00		25 00	285 00
Sorel.....	16 00	5 00	17 50		38 50
Three Rivers.....				42 30	42 30
	490 75	283 50	213 95	6,222 30	7,210 50

BRITISH COLUMBIA.

Ports.	Doctors' Services.	Doctors' Travelling Expenses.	Drugs.	Board.	Total Expenses.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Chemainus.....				269 99	269 99
Nanaimo.....				239 50	239 50
Port Simpson.....	34 00			22 90	56 90
Union Bay.....	281 00	120 00	186 15	340 00	927 15
Vancouver, St. Paul's.....				2,952 00	2,952 00
Victoria, St. Joseph.....				179 00	179 00
Victoria Marine Hospital.....				1,603 66	1,603 66
	315 00	120 00	186 15	5,607 05	6,228 20

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DETAILED EXPENDITURE FOR FUEL.

Nova Scotia—

Louisburg Marine Hospital.. . . .	\$105 00
Lunenburg Marine Hospital.. . . .	192 75
Pictou Marine Hospital.. . . .	171 78
Sydney Marine Hospital.. . . .	100 25
Yarmouth Marine Hospital.. . . .	226 50
	<hr/>
	\$796 28

New Brunswick—

Bathurst Marine Hospital.. . . .	\$22 92
Douglastown Marine Hospital.. . . .	73 13
	<hr/>
	96 05

British Columbia—

Victoria Marine Hospital.. . . .	\$214 50
	<hr/>
	214 50

Total expenditure for fuel.. . . . \$1,106 83

DETAILED EXPENDITURE FOR WATER SUPPLY.

<i>Nova Scotia</i> —Sydney Hospital.. . . .	\$17 00
<i>British Columbia</i> —Victoria Marine Hospital....	39 60

Total expenditure for water.. . . . \$56 60

DETAILED EXPENDITURE FOR TELEPHONE SERVICE.

Nova Scotia—

Lunenburg Marine Hospital.. . . .	\$41 66
Sydney Marine Hospital.. . . .	30 75
Yarmouth Marine Hospital.. . . .	61 25
	<hr/>
	\$133 66

New Brunswick—

Douglastown.. . . .	77 07
	<hr/>
	77 07

British Columbia—

Victoria.. . . .	66 00
	<hr/>
	66 00

Total expenditure for telephone.. . . . \$276 73

DETAILED EXPENDITURE FOR REPAIRS AND MAINTENANCE.

Nova Scotia—

Louisburg.. . . .	\$246 88
Sydney.. . . .	234 66
Yarmouth.. . . .	300 40
	<hr/>
	\$781 94

New Brunswick—

Douglastown.. . . .	\$1 00
	<hr/>
	1 00

British Columbia—

Victoria.. . . .	15 85
	<hr/>
	15 85

Total expenditure for repairs and maintenance.. . . . \$798 79

Total expenditure for telephone.. . . . \$276 73

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DETAILED Expenditure for Drugs, Surgical Instruments, Furniture, Stationery, etc.

	Drugs and Surgical Instruments		Other Supplies.	Total.
	\$	cts.	\$	cts.
Nova Scotia—				
Louisburg.....	266	38		266 38
Lunenburg.....	67	80		67 80
Sydney.....	58	50	98 80	157 30
Pictou.....			13 99	13 99
Point Tupper.....	21	00		21 00
Yarmouth.....	632	37	324 76	957 13
	1,046	05	437 55	1,483 60
New Brunswick—				
Bathurst.....	12	10		12 10
Douglastown.....	150	09	25 54	175 73
	162	19	25 54	187 73
British Columbia—				
Victoria.....	326	85	34 35	361 20
General account.....			281 71	281 71
Total expenditure for drugs, &c.				2,314 24

GRANTS TO SEAMEN'S SOCIETY.

Montreal Sailor's Club.....	\$ 200 00
Montreal Seamen's Institute.....	200 00
St. John's Seamen's Mission.....	200 00
Dr. Grenfell's Deep Sea Mission.....	200 00
Total amount.....	\$800 00

AMOUNT OF EXPENDITURE FOR TRANSPORTATION.

Nova Scotia—	
Barton.....	\$ 10 40
Church Point.....	5 00
Glace Bay.....	2 00
Halifax City Hospital.....	2 50
Halifax Victoria Hospital.....	37 50
Louisburg.....	18 07
Lunenburg.....	2 23
North Sydney.....	72 00
Parrsboro'.....	2 45
Weymouth.....	27 85
Yarmouth.....	8 25
	\$188 25
New Brunswick—	
Campbellton.....	\$ 34 86
	34 86

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AMOUNT OF EXPENDITURE FOR TRANSPORTATION.

Prince Edward Island

Charlottetown.. . . .	\$ 2 50
Souris.. . . .	2 75

5 25

Quebec—

Magdalen Islands.. . . .	\$ 1 50
Montreal Alexandra Hospital.. . . .	3 00
Montreal General Hospital.. . . .	44 00
Montreal Notre Dame.. . . .	26 50
Montreal Victoria Hospital.. . . .	2 00

77 00

British Columbia—

Nanaimo.. . . .	\$ 6 00
Victoria.. . . .	13 30

19 30

General Account—

Travelling expenses.. . . .	\$776 28
Express charges.. . . .	1 70

777 98

Total amount for transportation.. . . . \$1,102 64

TOTAL EXPENDITURE FOR NURSING.

Nova Scotia—

Barton.. . . .	\$ 53 00
Chester.. . . .	42 87
Lockeport.. . . .	3 00
Shelburne.. . . .	8 00
St. Peters.. . . .	2 00
Sydney.. . . .	2 00
Freeport.. . . .	10 00

\$120 87

Prince Edward Island—

Souris.. . . .	\$ 5 71
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5 71

Quebec—

Magdalen Island.. . . .	25 00
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25 00

British Columbia—

Victoria.. . . .	72 75
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72 75

Total expenditure for nursing.. . . . \$224 33

TOTAL EXPENDITURE FOR LIGHT.

British Columbia—

Victoria Marine Hospital.. . . .	\$96 52
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TOTAL EXPENDITURE FOR BURIALS.

<i>Nova Scotia</i> —	
Halifax Vict.	\$40 00
Meteghan.	2 00
	<hr/> 42 00
<i>New Brunswick</i> —	
Dalhousie.	\$12 25
St. John.	4 00
	<hr/> 16 25
Total amount for burials.	<hr/> \$58 25

TOTAL EXPENDITURE FOR MISCELLANEOUS.

<i>New Brunswick</i> —	
Bathurst.	\$ 68 25
	<hr/>
Total amount of physicians' travelling expenses in outposts, where there are no marine or other hospitals.	<hr/> \$2,825 15
Amount of expenditure for drugs supplied to sick seamen, out- side of hospitals, or outside of ports where physicians received a fixed salary.	<hr/> \$2,281 61
Total number of vouchers for each province—	
General account.	38
British Columbia.	108
Prince Edward Island.	86
New Brunswick.	111
Nova Scotia.	574
Province of Quebec.	97
	<hr/>
Total.	1,014

TABULAR STATEMENT showing Diseases for which Seamen received treatment during 1908-9.

General Diseases—905.

Small-pox.	8	Diseases dependant on animal para-	
Measles.	10	sites:—	
Scarlet fever.	3	Scabies.	12
Influenza.	111	Tenia.	2
Mumps.	1	Poisoning by tobacco.	1
Diphtheria.	13	Scurvy.	3
Cerebro Spinal fever.	1	Alcoholism.	5
Enteric fever.	93	Rheumatism.	136
Choleric Diarrhœa.	18	Gout.	2
Epidemic Diarrhœa.	7	Osteoarthritis.	5
Dysentery.	57	New Growths non-malignant.	1
Beriberi.	4	New Growths malignant.	2
Malarial fever.	49	Anemia.	6
Erysipelas.	28	Diabetes Mellitus.	3
Septicemia.	28	Congenital Malformations.	1
Tubercle.	45	Debility.	13
Syphilis.	78	Tetanus.	2
Gonorrhœa.	157		<hr/>
		Total.	905

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TABULAR STATEMENT showing Diseases for which Seamen received treatment during
1908-9—*Continued.*

Local Diseases—2,239.

Diseases of the nervous system.. ..	126	Diseases of the Digestive system: 757.	
1. Of the nerves—		Inflammation of the mouth.. . . .	2
Neuritis.. . . .	22	Ulceration of the mouth.. . . .	1
Multiple Neuritis.. . . .	3	Abscess of dental periosteum.. . . .	15
2. Of the Spinal cord and membranes		Toothache.. . . .	51
Inflammation.. . . .	2	Necrosis alveoli.. . . .	7
3. Of brains and membranes—		Sore throat.. . . .	2
Hemorrhage.. . . .	2	Inflammation of the tonsils.. . . .	65
Meningitis.. . . .	3	Inflammation of the pharynx.. . . .	19
Anemia.. . . .	1	Post pharyngeal abscess.. . . .	2
4. Functional nervous diseases with		Inflammation of stomach.. . . .	169
other diseases of undetermined		Ulceration of the stomach.. . . .	8
nature—		Hemorrhage of stomach.. . . .	5
Apoplexy.. . . .	1	Dilatation of stomach.. . . .	1
Paralysis.. . . .	7	Indigestion.. . . .	67
Spasm.. . . .	2	Vomiting.. . . .	2
Epilepsy.. . . .	2	Gastralgia.. . . .	9
Vertigo.. . . .	1	Inflammation of the intestines:—	
Headache.. . . .	4	Enteritis.. . . .	39
Neurasthenia.. . . .	19	Typhilitis.. . . .	7
Neuralgia.. . . .	51	Colitis.. . . .	13
Hysteria.. . . .	2	Appendicitis.. . . .	27
5. Mental diseases:—		Duodenitis.. . . .	2
Insanity.. . . .	4	Intestinal obstruction.. . . .	1
Diseases of the eye: 137.		Constipation.. . . .	13
Conjunctivitis.. . . .	68	Diarrhoea.. . . .	55
Keratitis.. . . .	4	Fistula in ano.. . . .	4
Ulceration of Cornea.. . . .	5	Prolapsus of rectum.. . . .	2
Iritis.. . . .	23	Ulcer of rectum.. . . .	1
Optic Neuritis.. . . .	2	Piles.. . . .	43
Abscess of lacrymal sac.. . . .	9	Inflammation of the liver.. . . .	38
Blepharitis marginalis.. . . .	7	Jaundice.. . . .	7
Abscess of eyelid.. . . .	6	Hernia.. . . .	42
Ecchymosis of eyelid.. . . .	13	Inflammation of hepatic ducts and	
Diseases of the ear: 57.		gall bladder.. . . .	13
Inflammation of external meatus.. . .	6	Calculi.. . . .	5
Accumulation of wax or epidermus.. .	1	Biliary colic.. . . .	2
Inflammation of middle ear.. . . .	42	Inflammation of the peritoneum.. . .	16
Abscess axilla.. . . .	8	Dropsy.. . . .	2
Diseases of the nose: 13.		Disease of the lymphatic system: 352.	
Inflammation of septum.. . . .	1	Inflammation of lymphatic glands..	52
Necrosis of septum.. . . .	2	Diseases of the thyroid body: 1.	
Inflammation of sinuses.. . . .	1	Goitre.. . . .	1
Inflammation of neso-pharynx.. . . .	9	Diseases of the urinary system: 104.	
Diseases of the circulatory system: 95.		Acute nephritis.. . . .	10
Pericarditis.. . . .	4	Bright's disease.. . . .	39
Endocarditis.. . . .	7	Abscess perinephritis.. . . .	3
Valvular diseases.. . . .	29	Calculi in kidney.. . . .	2
Aneurism heart.. . . .	2	Calculi in ureter.. . . .	5
Inflammation muscular substance		Haematuria.. . . .	6
herat.. . . .	4	Albuminuria.. . . .	2
Angina Pectoris.. . . .	4	Lithuria.. . . .	1
Arteritis.. . . .	3	Phosphaturia.. . . .	1
Degeneration of arteries.. . . .	6	Inflammation of bladder.. . . .	35
Phlebitis.. . . .	5	Diseases of the generative system: 233.	
Varicose ulcer.. . . .	31	Urethritis.. . . .	4
Diseases of the Respiratory system: 406.		Stricture of urethra.. . . .	19
Inflammation of larynx.. . . .	22	Inflammation of the prostate.. . . .	12
Bronchitis.. . . .	217	Phimosis.. . . .	9
Spasmodic Asthma.. . . .	16	Paraphimosis.. . . .	5
Congestion of lungs.. . . .	4	Inflammation of the glands.. . . .	1
Hemorrhage of lungs.. . . .	9	Soft chancre.. . . .	62
Pneumonia.. . . .	34	Inflammation of the scrotum.. . . .	21
Broncho-Pneumonia.. . . .	10	Inflammation of the spermatic cord..	18
Abscess of lungs.. . . .	4	Varicocele.. . . .	34
Phthisis.. . . .	42	Inflammation of the testicle.. . . .	29
Pleurisy.. . . .	46	Epididymitis.. . . .	18
Empyema.. . . .	1	Cryptorchidism.. . . .	1
Injury to lungs.. . . .	1		

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TABULAR STATEMENT showing Diseases for which Seamen received treatment during
1908-9—Continued.

Local Diseases—Continued.

Diseases of the organs of locomotion: 120.		Diseases of the skin: 117.	
Inflammation of the bones.. . . .		Erythema.. . . .	2
Osteitis.. . . .	1	Urticaria.. . . .	2
Periostitis.. . . .	7	Eczema.. . . .	25
Caries.. . . .	1	Herpes.. . . .	5
Inflammation of the joints.. . . .	22	Dermatitis.. . . .	1
Dislocation of ankle.. . . .	9	Acne.. . . .	1
Dislocation of spine.. . . .	1	Seborrhea.. . . .	1
Psoas, lumbar and other abscesses..	26	Ulcer.. . . .	16
Lumbago.. . . .	24	Boils.. . . .	42
Sciatica.. . . .	23	Carbuncle.. . . .	9
Inflammation of bursa.. . . .	6	Whitlow.. . . .	9
Diseases of connective tissues: 21.		Oncychia.. . . .	1
Cellulitis.. . . .	18	Ringworm.. . . .	1
Abscess.. . . .	1	Frostbite.. . . .	2
Gangrene.. . . .	2	Total.. . . .	2,239

Injuries—640.

General Injuries: 29.		Sprain of hand.. . . .	5
Effects of heat.. . . .	4	Wound of upper extremities.. . . .	31
Burns and scalds.. . . .	20	Fracture of clavicle.. . . .	16
Multiple injury.. . . .	2	Fracture of scapula.. . . .	11
Suffocation (drowning).. . . .	1	Fracture of humerus.. . . .	46
Shock.. . . .	2	Fracture of radius.. . . .	17
Local injuries: 611.		Fracture of ulna.. . . .	27
Rupture of muscles.. . . .	1	Fracture of radius and ulna.. . . .	20
Wound of muscles.. . . .	1	Fracture of carpus metacarpus and phalanges.. . . .	8
Burns and scalds of skin.. . . .	18	Dislocation of humerus.. . . .	14
Wounds scalp.. . . .	24	Dislocation of phalanges or thumb..	5
Fracture of vault of skull.. . . .	1	Contusion of lower extremities.. . .	9
Concussion of brains.. . . .	3	Sprain of hip.. . . .	8
Contusion of eyelid.. . . .	1	Sprain of knee.. . . .	10
Wound of eyelid.. . . .	2	Sprain of ankle.. . . .	45
Wound of eyeball.. . . .	2	Sprain of foot.. . . .	19
Foreign bodies in nose and other cavities.. . . .	3	Fracture of femur.. . . .	16
Wound of neck.. . . .	2	Fracture of patella.. . . .	2
Wound of chest.. . . .	1	Fracture of tibia.. . . .	15
Contusion of chest.. . . .	2	Fracture of febula.. . . .	6
Fracture of ribs.. . . .	21	Fracture of tibia and febula.. . . .	4
Sprain of back.. . . .	5	Fracture of bones of foot.. . . .	1
Wound of back.. . . .	4	Malingery.. . . .	2
Contusion of abdomen.. . . .	2	Vaccination.. . . .	1
Contusion of upper extremities..	134	Incomplete reports.. . . .	8
Sprain of shoulder.. . . .	4	Total.. . . .	640
Sprain of elbow.. . . .	2		
Sprain of wrist.. . . .	34		

Total number of seamen treated.. . . . 3,784

APPENDIX No. 14.

REPORT OF THE CHIEF EXAMINER OF MASTERS AND MATES.

GEORGE J. DESBARATS, Esq.,

Acting Deputy Minister of Marine and Fisheries,
Ottawa, Ont.

SIR,—I beg to submit my annual report giving details of the work I have the honour to supervise respecting examinations of masters and mates throughout the Dominion.

The statistics herewith submitted are from the 1st of September, 1908, date of my last report, to the 1st of April, 1909, covering a period of seven months.

Compared with a corresponding number of months, the records show a marked increase in the number of examinations. It will also be noted that a greater number of failures have occurred, which, conclusively, demonstrate that greater supervision and care have been and are now exercised in order to secure but able and competent men ready to meet the actual requirements of the rapid development of traffic by water.

I am happy to state that the examiners under my supervision are men of high qualifications who have so far performed their onerous duties under trying circumstances in a conscientious and satisfactory manner.

Yearly, more problems are added and a greater knowledge is required from all candidates, and this is, as it should be, the sea-faring class is waking to the fact that higher qualifications are now needed on their part and they have submitted willingly to the inevitable. Shipowners have testified that the class of seamen now available is superior to what was on hand a few years ago; therefore I claim that as the exigencies of traffic become more exacting; for instance, if ship's tonnage increase as well as their number, so must the standard of knowledge of officers who will be placed in charge of property running into hundreds of thousands of dollars.

I contend that as the knowledge in matters pertaining to that profession is increased greater will be the confidence and coolness in times of danger, and as after results, men holding certificates under those conditions, will be inspired with greater self-respect, and it will serve to raise their professional status in a very marked degree.

In connection with those examinations, I beg to bring to your kind attention that in order to secure the highest efficiency, a very exact and conscientious supervision must be exercised, and to expect a devotion to the work so that the best results may accrue, it would be well that the remuneration to examiners be such as to inspire them with the idea that their labours and conscientious attendance to their duties are duly appreciated by the department.

Examination of masters and mates may rightly be classed as first aid to navigation; lights, beacons and buoys are certainly secondary in importance.

In the erection of lighthouses every effort is made to introduce the highest and most efficient illuminating apparatus in order that the lights may warn the navigators of the dangers and its proximity, and all these lights and precautions taken to indicate obstacles in the way of the mariners will be fruitless unless the men in charge are fully conversant with the means and methods to utilize these aids to navigation to the best advantage.

I have the honour to be, sir,

Your obedient servant,

L. A. DEMERS,
Chief Examiner.

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STATEMENT.

Inland, coasting and minor waters—

	Passed.	Failed.
Masters.. . . .	70	21
Mates.. . . .	93	25

Sea-going—

Masters.. . . .	8	0
Mates.. . . .	15	8
Second mates.. . . .	12	8

Service certificates—

Masters.. . . .	2	..
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Temporary certificates—

Masters.. . . .	4	..
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Renewed certificates of competency for inland and coasting—

Masters.. . . .	8	..
Mates.. . . .	2	..

Renewed certificates of competency for sea-going—

Masters.. . . .	4	..
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The ports where examinations for all grades are held are:—

Victoria, B.C., Capt. James Gaudin, examiner.
 Vancouver, B.C., Capt. Charles Eddie, examiner.
 Halifax, N.S., Capt. W. R. Lugar, examiner.
 Yarmouth, N.S., Capt. J. E. Murphy, examiner.
 Lunenburg, N.S., Capt. A. J. Wolff, examiner.
 North Sydney, N.S., Capt. J. Sutherland, examiner.

Examination for local certificates only held at:—

Montreal, P.Q., Capt. J. Riley, examiner.
 Quebec, Que., position at present vacant.
 Toronto, Ont., Capt. Charles Moller, examiner.
 Collingwood, Ont., Capt. Geo. C. Coles, examiner.
 West Selkirk, Man., Capt. M. Thordarson, examiner.
 Edmonton, Alta, Capt. A. Grand, examiner.
 Nelson, B.C., Lt. Gordon Hallet, examiner.

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APPENDIX No. 15.

MARINE SCHOOLS.

GEORGE J. DESBARATS, Esq.,

Acting Deputy Minister of Marine and Fisheries,
Ottawa, Ont.

SIR,—I beg to herewith submit my annual report and statement of attendance at the marine schools under my supervision for the winter of 1908-9.

These marine schools have been instituted with the view of enlightening those who are preparing themselves to enter the sea-faring career as well as those who already have experience in that profession, by delivering a series of lectures treating on all subjects most important to prospective candidates for examination of masters and mates, as well as for pilots and prospective pilots.

By the statement herewith submitted it will be seen that nine lecturers assisted at these lectures.

Through an amendment to the Shipping Act passed last session, by which coasting vessels of hundred and fifty tons are allowed to sail from any port in Canada on a coasting voyage extending to Venezuela, without a qualified master, and that vessels of three hundred tons are allowed to sail without a qualified or certificated mate, has had the effect of diminishing somewhat the attendance at the schools established in Nova Scotia, such as Lunenburg and North Sydney. It will be noted that Vancouver had the largest attendance.

These lectures are given by the examiners of masters and mates, who are thoroughly competent to discuss any matters pertaining to shipping. This subject being of a dry nature, it requires besides the knowledge on the part of the examiners also the talent and fluency of speech, in order to deliver those lectures in an interesting and attractive manner, and I think that those in charge of those schools are fully competent in that way. They have all been supplied with instruments and materials to help them in their task. By means of a reflectoscope, drawings and illustrations are thrown on the screen enabling and helping the lecturer to develop more fully the subjects under analysis.

Though the attendance at Lunenburg and North Sydney is not exactly satisfactory, still I think that sooner or later, our seafarers will come to realize the importance of the matter, and by their steady attendance to the lectures, will convey to the government the expression that the efforts made for their welfare and their education, are fully appreciated.

Owing to the fact that the examiner at Quebec had resigned and that there were no candidates applying for the position, no lectures were given this winter at that port.

I herewith submit a statement of attendance, minimum and maximum at each school.

I have the honour to be, sir,

Your obedient servant,

L. A. DEMERS,

Superintendent of Marine Schools of Canada.

SESSIONAL PAPER No. 21

STATEMENT OF ATTENDANCE.

Schools.	Lecturers.	No. of Lectures.	Minimum.	Maximum.	Average.	Total Attendance.
Victoria, B.C.....	D. Jones.....	33	12	28	18·87	623
Vancouver, B.C.....	Capt. Eddie ..	32	15	50	29·22	934
Yarmouth, N.S.....	" Murphy ..	32	0	14	7·25	232
Lunenburg, N.S.....	" Wolff ..	32	0	18	4·34	139
Halifax, N.S.....	" Lugar ..	31	4	27	12·42	385
North Sydney, N.S.....	" Suther- land ..	32	0	11	5·3	176
Midland, Ont.....	" Watkins.	36	3	30	19·61	706
Collingwood, Ont ..	" Coles....	24	2	28	17·4	419
Toronto, Ont.....	" Moller...	32	7	18	12·	384

APPENDIX No. 16.

INVESTIGATIONS INTO WRECKS AND CASUALTIES.

GEORGE J. DESBARATS, Esq.,

Acting Deputy Minister of Marine and Fisheries,
Ottawa, Ont.

DEAR SIR,—I beg to submit the annual report with reference to investigations into shipping casualties, held by Captain Spain, during 1908-9, a list of which is annexed.

Besides the casualties mentioned, there are few others, which, through pressure of business, were not investigated at the time, and owing to the long interval between the casualties and the return of the vessels to ports during the present season, it was found, in several cases, useless to deal further with them, as the most important witnesses were unavailable.

I have the honour to be, sir,
Your obedient servant,

L. A. DEMERS.

INVESTIGATIONS HELD BY CAPTAIN SPAIN, 1908-09.

Date.	Name of Vessels.	File Number.	Occurred at.
1908.			
April 29.....	Bona Vista.....	28,988	Stranded below Traverse.
July 5.....	Imperial-Quebec.....	29,139	Poulier Varennes.
" 12.....	Portsmouth.....	29,148	Off Cape Chatte.
" 16.....	India.....	29,151	Below Pt. Citrouille Light.
August 7.....	Premier.....	29,194	Lake Winnipeg.
" 8.....	Catalone.....	29,223	Red Island.
" 11.....	Sagamo-Kenosha.....	29,224	Beaumaris.
" 11.....	Southwark.....	29,198	West Point, Forteau Bay.
" 15.....	Sverre.....	29,221	Traverse Lower Light.
September 5.....	King Edward.....	29,263	Chantey Island.
" 6.....	Gustaf Adolf.....	29,256	Goose Island.
" 13.....	Corinthian-Malin Head.....	29,269	Below Quebec, off St. Laurent
" 17.....	Marina.....	29,276	Ashore near Varennes.
" 20.....	Regulus-Ocland.....	29,288	
" 20.....	Amur-Vadso.....	29,309	McKays Beach, B.C.
October 2.....	Inishowen Head.....	29,308	Ashore 5 miles above Quebec.
" 13.....	Ariel-Energy.....	29,349	
" 19.....	Refina-John Irving.....	29,326	Halifax Harbour.
" 20.....	SS. Virginian.....	29,328	Montreal Harbour.
" 26.....	SS. Ashanti.....	29,334	Isle of Orleans.
" 26.....	Iroquois.....	29,343	Gulf of Georgia, B.C.
November 6.....	Lena F. Oxner.....	29,361	Red Island Reefs.
" 8.....	C.P.R. Liner and Japanese Liner.....	29,360	Vancouver Harbour.
1909.			
January 16.....	Hartfield.....	29,191	Vancouver Island.
" 16.....	Bruce.....	29,228	Baldwins Reefs.

APPENDIX No. 17.

WIRELESS TELEGRAPHY.

GEORGE J. DESBARATS, Esq.,

Acting Deputy Minister of Marine and Fisheries,
Ottawa, Ont.

SIR,—I beg to submit herewith my annual report on the wireless stations belonging to this department.

There were twenty wireless stations operated by the department during the past year, located at the following points:—

Father Point, River St. Lawrence.
Clarke City, “
Fame Point, “
Heath Point, Anticosti.
Cape Bear, Prince Edward Island.
Pictou, Nova Scotia.
Cape Race, Newfoundland.
Whittle Rocks, Gulf of St. Lawrence.
Point Amour, “ “
Belle Isle “ “
Point Rich, “ “
Cape Ray, Newfoundland.
Sydney, Nova Scotia.
Cape Sable, Nova Scotia.
Partridge Island, New Brunswick.
Point Grey, British Columbia.
Victoria, “
Pachena, “
Estevan “
Cape Lazo “

All stations have worked satisfactorily.

On account of not having received complete returns I cannot give the number of messages sent and received from the different stations.

I have the honour to be, sir,
Your obedient servant,

C. DOUTRE,
Supt. Govt. Wireless Stations.

APPENDIX No. 18.

SABLE ISLAND.

SIR,—I beg to submit the following report on equipment, repairs to buildings, stock, patrol, &c., for the year ending December 31, 1908.

WRECKS AND CASUALTIES.

No known wrecks have occurred during the year.

'White Point' buoy drifted ashore on the northeast bar January 12. 'Sambro' automatic gas buoy drifted ashore near the east end light January 18, both of these buoys were taken off by the D.G.S. *Lady Laurier* early in the season.

Two fishermen's dories, no name, came ashore during October.

BOATS AND APPARATUS.

The beach apparatus (Lyle gun) at Nos. 1, 3 and 4 stations are in good condition, also the boats at the different stations. In my report for the year 1907, I pointed out the necessity for another cargo surf boat and a life boat to replace the old boat *Relief* sent off during that year and condemned.

PATROL.

The island was patrolled forty-two times in the morning and thirteen times at night.

STAFF CHANGES.

Wm. H. Horne, keeper of east light, resigned and was succeeded by John Grigoire, April 23.

BUILDING AND REPAIRS.

Men's quarters removed south 100 feet and an addition of seven rooms and cellar built on to it with concrete wall under both main building and addition.

Cattle barn.—Concrete wall under north side and concrete floor under cattle. Drill pole erected.

No. 4 Station.—Keeper's dwelling raised and concrete blocks placed under for foundation to replace old rotten posts, chimney retopped and new sheeting put under sills. Roof shingles repaired.

FARMING.

This was carried on as usual, but owing to the unusual dry season results were not equal to that of some previous years.

LIVE STOCK ON HAND.

Seventy head cattle, 30 trained ponies, 3 imported stallions, 5 imported mares, 5 hogs, 200 wild ponies.

STOCK KILLED.

	Lbs.
Nine beeves weighing	5,950
Nine hogs weighing	1,300
Six calves weighing	360

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SHIPPED.

Forty-nine ponies, quantity salted hides.

CENSUS.

No. 1 Station—

Supt. R. J. Boutilier, daughter and domestic.. . . .	3	
Carpenter, Wm. Byrne; cook, Roby. Cleary; supernumary, J. Dunn; surfmen, S. Himmelman, A. Byrne, S. Glaze- brook, R. S. Boutilier, M. Noonan.. . . .	8	— 11

No. 2 Station—

Keeper and coxwain, R. Naugle and family.. . . .	4	
--------------------------------------------------	---	--

No. 3 Station—

Keeper, Jas. Ritcey and family.. . . .	4	
Surfman, E. Osborne.. . . .	1	— 5

No. 4 Station—

Keeper and chief coxwain, Gustav Soderberg and wife.. . .	2	
Surfman G. Malally.. . . .	1	
Surfman Jno. Lee.. . . .	1	— 4

West End Light—

Keeper, A. J. Horne, wife and family.. . . .	5	
Surfman and assistant, Jas. Horne.. . . .	1	— 6

East End Light—

Keeper, John Grigoire and family.. . . .	5	
Surfman and assistant, H. Naugle.. . . .	1	— 6

Marconi Wireless Telegraph Station—

Chief, J. D. Taylor; operators, D. Manson, Jas. Surgey, G. Blackburn; cook, Ted Strickland.. . . .	5	— 5
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Total.. . . . 41

(Sgd.) R. J. BOUTILIER,
Supt., Sable Island

APPENDIX No. 19.

LIFE-SAVING SERVICE OF CANADA.

The Deputy Minister of Marine and Fisheries,
Ottawa.

SIR,—I have the honour to report on the life saving service of Canada with respect to the fiscal year 1908-9.

Though I have been connected with this service only about six months, I have visited several of the life-saving stations, my report in regard to which was duly laid before you.

The great purpose of a life-saving station is, as its name indicates, to save human life by providing prompt and sufficient aid, when possible, in cases of shipwrecked and distressed vessels, so as to prevent loss of life by drowning. As a rule the period each year during which a life-saving station is in full operation is during the season of navigation.

There are at the present time in Canada 34 life-saving stations of more or less importance and efficiency, established along the sea coasts and on the shores of the great lakes near localities where navigation is the most perilous. The locations of life-saving stations with respect to provinces, are, 3 in New Brunswick, 13 in Nova Scotia, 3 in Prince Edward Island, 4 in British Columbia, and 11 in Ontario (on the great lakes.)

At every life-saving station there is at least a life boat and a crew of seven men including the coxswain under whose immediate care and supervision all manoeuvres and operations of the crew are performed. There is also a boat house. During recent years many of the stations have been supplied with new and up to date life boats costing from \$225 to \$775 each and one \$10,900. Boat houses are built of different sizes according to the number of boats and other equipment to be accommodated, and cost from \$600 up. Besides being always on the alert to add to the efficiency of this service in other respects, care is taken by the department to see that the boat houses and boats of the various stations are kept painted and that all other equipment and apparatus are also properly looked after so that the best results may be obtained.

A coxswain appointed by the department is in charge of each life-saving station and its equipment, and is responsible to the department for the proper care of the same. The coxswain also selects the crew for the life boat which, with himself, consists of seven men, and the crew is directly under his charge when on duty whether in service at a wreck or when performing drills of which the maximum number is fourteen each season. As the position of coxswain is a responsible one, the regulations governing this service require that the person appointed to fill that position shall be of good moral character and of sober and correct habits. He must have a fair education and be familiar with the line of coast embraced within his district, and he must possess a thorough knowledge of the management of life boats and of the use of the various apparatus employed in the service. The coxswain must also understand how to properly treat the apparently drowned, according to the written regulations with which every life-saving station is provided. Besides, it is the duty of the coxswain to be always on the lookout to assist persons in danger of drowning. As a rule, a coxswain is allowed \$75 per annum for taking care of the station and \$2 for each drill. He is also allowed such extra pay when engaged at a wreck as the department considers proper.

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The life boat crew at every life-saving station is selected by the coxswain from able-bodied and experienced boatmen residing near the station, so that they will always be available when required. As the efficiency of a life-saving station depends largely upon the good training and discipline of the crew, each crew is required to drill regularly during the season of navigation, in rough water as well as smooth. The number of drills to be performed by a life boat crew is fourteen each season, and must be carried out at regular intervals as fixed by the coxswain, and each drill must occupy at least five hours. Life boat crews as a rule, are paid at the rate of \$2 per man for each drill and extra when performing service at a wreck.

I attach hereto a list of the life-saving stations maintained by the Dominion government, showing the name of each station, when established, name of the coxswain and his annual salary, number of the crew and their pay, description and cost of the boat in use, and equipment.

During the year four new life-stations have been established, one at Point Escuminac, N.B., and one each at Clo-oose, Ucluclet and Clayoquet, B.C. The life-saving station at Mud Island, N.S., has been discontinued.

The life-saving stations at St. Pauls Island and Sable Island are under the control of the respective superintendents of the humane establishments of those islands and are amongst the best equipped stations in Canada.

At the life-saving station at Long Point, Lake Erie, the men are employed two or three months longer than at the other stations and their remuneration is more.

While some minor casualties have been reported to the department during the last season in which life-saving crews have rendered assistance to vessels, no serious casualties involving danger to life have taken place.

During the past three years there has been an average yearly expenditure of over \$25,000 in connection with this branch of the public service, and a number of the stations have been fitted out with new and expensive apparatus and boats, yet with Canada's almost illimitable stretches of coast lines and ever increasing coasting trade, there is still much to be done to bring this service up to that state of efficiency which its importance demands.

I have the honour to be, sir,

Your obedient servant,

C. E. KINGSMILL,

Officer Commanding the Marine Service of Canada.

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Life-Saving Stations maintained

Number.	Stations.	Established.	Coxswain.	Crew.	Coxswain's Salary. — Per annum.	Pay of Crew.
<i>New Brunswick—</i>						
1	Seal Cove	1898	T. Benson	7	75	\$2 per day and extra when saving life.
2	Richibucto.....	1907	Albert Long ...	7	75	" " ..
3	Point Escuminac.....	1908	E. F. Fleiger....	7	75	" " ..
<i>Nova Scotia—</i>						
4	Baker's Cove.....	1886	A. Cain.....	7	75	" " ..
5	Blanche.....	1889	W. A. B. Smith.	7	75	" " ..
6	Clark's Harbour	1900	T. N. Nickerson.	7	75	" " ..
7	Devil's Island.....	1885	B. H. Henneberry.	7	75	" " ..
8	Duncan's Cove.....	1886	J. W. Holland..	7	75	" " ..
9	Herring Cove.....	1885	J. Gorman.....	7	75	" " ..
10	Pictou Island.....	1889	Alex. Currie....	7	75	" " ..
11	Port Mouton.....	1889	Walter Cook....	7	75	" " ..
12	Scatarie.....	1885	J. T. Martell,..	7	75	" " ..
13	Seal Island.....	1880	Thos. Symonds .	7	250	\$100 per annum.
14	St. Paul's Island.....	1885	Supt. Humane Establishment.	3	.....	\$300 each per annum.
15	White Head.....	1890	H. P. Munroe ..	7	75	\$2 per drill and extra when saving life.
16	Sable Island.....	1885	(G. Soderberg.. (J. Ritcey.....	..... .....	250 250)	Paid as island staff.
<i>P. E. Island—</i>						
17	Charlottetown.....	1907	J. P. Moore	7	75	\$2 per drill and extra when saving life.
18	Souris.....	1907	N. McIntosh. ...	7	75	" " ..
19	Alberton	1907	John Champion.	7	75	" " ..
<i>British Columbia—</i>						
20	Clo-oose.....	1908	D. Logan. ....	.....	60 perm.	\$45 per month for three months.
21	Bamfield	1907	W. H. Gillen. ...	.....	75 perm.	\$50 for engineer, \$45 for two men per month.
22	Ucluclet	1908	A. W. Lyche....	6	75 perm.	\$60 per month for men during season and \$100 per annum when boat is not in commission. Volunteers 50 cents per hour when required.
23	Clayoquot.....	1908	J. Chesterman..	7	75	\$60 per month when employed. Volunteers 50 cents per hour when required.
<i>Ontario—</i>						
<i>Great Lakes—</i>						
24	Coburg.....	1882	D. Rooney.....	7	75	\$2 per drill and extra when saving life.
25	Collingwood.....	1885	G. F. Watts....	7	75	" " ..
26	Goderich	1886	D. MacKay....	7	75	" " ..
27	Kincardine.....	1903	Thos. McGaw..	7	75	" " ..

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by the Dominion Government.

Description of Boat.	Cost.	When Built.	Equipment.	Remarks.
	3			
Beebe-McLellan surf-boat, self-bailing, 25 feet long.	250	Shelburne, N.S.	Full regulation..	Iron rails laid in 1901.
Race point surf-boat, 24 feet long..	225	" ..	" ..	
Beebe-McLellan self-bailing....	225	" ..	" ..	
Dobbin's pattern self-righting, 25 feet long.	575	Dartmouth, N.S.	" ..	Iron rails laid in 1900.
Beebe-McLellan surf boat, self-bailing, 25 feet long.	250	" ..	" ..	New boat, 1901.
Beebe-McLellan self-bailing, 25 feet long, low ends.	250	" ..	" ..	
Dobbin's pattern, surf-boat, self-bailing, 25 feet long.	575	" ..	" ..	Lyle gun at this station.
Beebe-McLellan surf-boat, self-bailing, 25 feet long.	250	Shelburne, N.S.	" ..	Lyle gun at this station and new boat in 1903.
" " ..	250	" ..	" ..	
Dobbin's pattern, self-righting and bailing, 25 feet long.	575	Dartmouth, N.S.	" ..	
" " ..	575	" ..	" ..	
Beebe-McLellan surf-boat, self-bailing, 25 feet long.	250	Shelburne, N.S.	" ..	New boat in 1903.
Beebe-McLellan boat on east side.	240	" ..	" ..	"
Beebe-McLellan boat on west side.	240	Halifax, N.S....	" ..	
Beebe-McLellan self-bailing, 25 feet long, low ends.	250	Shelburne, N.S.	" ..	Lyle gun here since 1903.
Dobbin's pattern, surf-boat, self-bailing, 25 feet long.	575	Dartmouth, N.S.	" ..	
Two Dobbin's pattern, self-righting and bailing, and one Beebe-McLellan surf-boat, self-bailing.	1,100	Halifax, N.S....	" ..	Lyle gun and rocket apparatus at this station. Coxswain under control of Supt. of Humane Establishment.
Beebe-McLellan self-bailing.	225	Shelburne, N.S.	" ..	
" " ..	225	" ..	" ..	
" " ..	225	" ..	" ..	
Doherty's Improved Beebe-McLellan, 25 feet long.	575	Vancouver Shipyard Co., Vancouver, B.C.	" ..	
Self-righting self-bailing power lifeboat, 36 feet long.	10,900	Bayonne City, U.S.A.	" ..	
Doherty's Improved Beebe McLellan, 25 feet long.	575	Vancouver Shipyard Co.	" ..	
" " ..	575	" ..	" ..	
Dobbin's pattern, self-righting and bailing.	750	Goderich, Ont..	" ..	
Beebe-McLellan self-bailing, surf-boat.	375	Collingwood, O.	" ..	New boat in 1896.
Surf-boat.....	330	" ..	" ..	New boat in 1892.
Beebe-McLellan self-bailing, surf-boat.	350	" ..	" ..	New boat in 1903.

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Life-Saving Stations maintained

Number.	Stations.	Established.	Coxswain.	Crew.	Coxswain's Salary. Per annum.	Pay of Crew.
					\$	
28	Long Point.....	1902	Geo. Wisner....	7	75	\$2 per drill and \$40 per month for three months.
29	Point Pelee.....	1900	L. Wilkinson....	7	75	\$2 per drill and extra when saving life.
30	Port Hope.....	1889	W. T. Clark. ..	7	75	" " ..
31	Port Stanley.....	1885	J. R. Moore....	7	75	" " ..
32	Toronto Island.....	1883	Wm. Ward.....	7	75	" " ..
33	Consecon.....	1898	John O. McLean	7	75	" " ..
34	Southampton.....	1907	John A. Mac-Auley.	7	75	" " ..

NOTE—

There are several other places in Canada, not regularly organized, which receive support from the N.S., Cape Tormentine, N.B. and Wellington on Lake Ontario. There is also a life saving station at

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by the Dominion Government—*Concluded.*

Description of Boat.	Cost.	When Built.	Equipment.	Remarks.
	\$			
Surf-boat...	500	Collingwood, O.	Full regulation..	
"	330	" ..	" ..	A tramway has been constructed at this station.
Dobbin's pattern, self-righting and bailing.	620	Goderich, Ont..	" ..	
Beebe-McLellan surf-boat, self-bailing, 25 feet long.	350	Collingwood, O.	" ..	
Dobbin's pattern, self-righting and bailing.	600	Goderich, Ont..	" ..	Removed from Popular Point in 1900.
" ..	750	" ..	" ..	Removed from Wellington in 1893.
Beebe-McLellan surf-boat, self-bailing.	330	Collingwood, O.	" ..	

Dominion Government, where there is a life saving service of more or less importance, such as Halifax, Victoria, B.C., maintained by the Victoria Life Saving Association.

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APPENDIX

HALIFAX CITADEL

RECORD OF SHIPPING, AS PER RECORD FOLIO,

Year and Month.	BRITISH MEN-OF-WAR.			FOREIGN MEN-OF-WAR.			1ST CLASS STEAMERS.			2ND CLASS STEAMERS.		
	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.
1908.												
July				1	1		63	60	3	61	61	
August				3	3		54	54		66	66	
September				1	1		54	51	3	61	61	
October	1	1					45	43	2	66	65	1
November							58	52	6	52	52	
December	1	1					62	61	1	60	60	
1909.												
January							59	57	2	40	40	
February							55	54	1	39	39	
March							54	52	2	37	37	
	2	2		5	5		504	484	20	482	481	1

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No. 20.

SIGNAL STATION.

FROM JULY 1, 1908, TO MARCH 31, 1909.

SHIPS, BARQUES AND BARQUENTINES.			BRIGS AND BRIGANTINES.			SCHOONERS, 3-MAST OR BEARING PRIVATE SIGNALS.			MONTHLY TOTALS.			Remarks.
Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	Reported.	Arrived.	Passed.	
2	2	5	5	132	129	3	Total vessels reported..... 1,054 " arrived..... 1,033 " passed..... 21
1	1	.....	1	1	.....	10	10	.....	135	135	...
2	2	.....			.....	5	5	..	123	120	3
1	1	.....			.....	7	7	.....	120	117	3
3	3	.....			.....	5	5	.....	118	112	6
1	1	.....			.....	5	5	.....	129	128	1
.....	..	.....	1	1	.....			.....	100	98	2
1	1	.....			.....	3	3	.....	98	97	1
.....		.....			.....	8	8	..	99	97	2
11	11	.....	2	2	.....	48	48	.....	1,054	1,033	21

APPENDIX No. 21.

HARBOUR MASTERS.

TABLE showing the names of Ports proclaimed under certain Dominion Acts, the provisions of which are found in the Canada Shipping Act, chapter 113, Revised Statutes of Canada, 1906, for the appointment of harbour masters; the dates of proclamation; the names of the harbour masters appointed; the dates of the appointment of harbour masters; the amounts which each of their salaries is not to exceed; the amount of fees collected by each of them during the calendar year ended December 31, 1908, and the overplus, if any, paid to the credit of the Receiver General, for the year ended December 31, 1908.

PROVINCE OF ONTARIO.

Names of Port.	Harbour Masters.	Date of Appointment.	Amount Collected.	Remuneration Allowed.	Amount paid to Cr. R. G.
			\$ cts.	\$ cts.	\$ cts.
Amherstburg.....	M. Barrett.....	Dec. 29, 1906.	199 00	200 00	
Bronte.....	J. Wilson.....	Oct. 26, 1905.	4 50	200 00	
Byng Inlet.....	C. E. Begin.....	Mar. 24, 1908.	25 50	200 00	
Collingwood.....	F. Toner.....	Dec. 31, 1908.	158 00	300 00	
Depot Harbour.....	W. H. Hoppins.....	April 15, 1907.	58 00	200 00	
Fort William.....	J. McAilister.....	May 12, 1906.	685 00	600 00	*84 75
French River.....	E. Barron.....		21 00	200 00	
Goderich.....	D. McKay.....	April 21, 1908.	60 00	300 00	
Little Current.....	J. F. May.....	July 19, 1906.	185 50	200 00	
Meaford.....	S. McClain.....	" 16, 1902.	30 00	200 00	
Midland.....	J. White.....	" 13, 1897.	137 00	300 00	
Oshawa.....	W. T. Henry.....	Aug. 10, 1904.	Nil.	300 00	
Parry Sound.....	B. Taylor.....	April 27, 1909.	47 00	200 00	
Penetanguishene.....	P. Light.....	May 7, 1906.	24 00	200 00	
Port Arthur.....	B. Guérard.....	" 21, 1897.	335 00	300 00	35 00
Port Stanley.....	F. K. Shephard.....	Jan. 15, 1898.		200 00	
Rondeau.....	W. R. Fellows.....	Dec. 17, 1888.	23 50	100 00	
Southampton.....	W. H. Johnston.....	Oct. —, 1882.	40 00	100 00	
".....	Geo. McVittie, depy. h.m.				
Sarnia.....	R. McAdam.....	May 3, 1886.	Nil.	300 00	

PROVINCE OF QUEBEC.

Amherst Harbour.....	J. Cassidy.....	Sept. 2, 1878.	11 50	200 00	
Bonaventure.....	A. Bourque.....	June 5, 1905.	9 00	100 00	
Cape Cove.....	J. Scott.....	July 15, 1908.	1 00	200 00	
Chicoutimi.....	A. Sturton.....	June 8, 1886	65 00	200 00	
Grand Entry.....	J. A. Chenell.....	Feb. 19, 1892.	1 50	200 00	
Grand River.....	G. Baudin.....	April 8, 1900.	18 00	100 00	
Gaspé.....	F. J. Eden.....	" 3, 1889.	62 50	500 00	
House Harbour.....	G. Lafrance.....	Dec. 10, 1896.	24 50	200 00	
Maria.....	A. Cyr.....	Mar. 29, 1905.	1 50	100 00	
Matane.....	L. J. Levasseur.....	Dec. 12, 1896	69 00	200 00	
Malbaie.....	P. Lawrence.....		17 00	200 00	
New Carlisle.....	J. Chisholm.....	April 22, 1902.	7 50	200 00	
New Richmond.....	F. X. Cormier.....	" 15, 1902.	25 00	200 00	
Nouvelle.....	J. Casey.....	Jan. 3, 1903.	22 00	200 00	
Oak Bay.....	T. Harper.....	July 12, 1904.	12 50	200 00	
Paspébiac.....	W. L. Kempffer.....	Sept. 21, 1900.	37 50	150 00	
Percé.....	E. Donohue.....	Oct. 10, 1903.	5 00	100 00	
Port Daniel.....	B. Langlois.....	Feb. 26, 1907.	7 00	200 00	
Rimouski.....	A. P. St. Laurent.....	May 13, 1896.	76 50	200 00	
Riv. du Loup.....	F. E. Gilbert.....	Oct. 5, 1902.	55 00	100 00	
St. Ths. Montmagny.....	L. Dionne.....	" 22, 1896.	24 00	200 00	
St. Johns.....	G. H. Farrar.....	Mar. 20, 1897.	718 00	600 00	118 00
Sorel.....	J. A. Proulx.....	June 6, 1901.	563 00	400 00	163 00
Tadousac.....	A. Gingras.....	" 6, 1906.	10 50	200 00	
Trois Pistoies.....	E. T. Petitgrew.....	April 11, 1899.	Nil.	150 00	

* For P. O. A., 25 cents.

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TABLE showing names of ports, harbour masters, collections, salaries, &c.—*Continued.*

PROVINCE OF NEW BRUNSWICK.

Names of Port.	Harbour Masters.	Date of Appointment.	Amount Collected.	Remuneration Allowed.	Amount paid to Cr. R.G.
			\$ cts.	\$ cts.	\$ cts.
Alma	G. W. Parson	Mar. 2, '98..	16 50	100 00	
Bathurst	Capt. M. Daly	Apr. 15, '07 .	45 50	200 00	
Black's Harbour and Beaver Harbour	E. W. Cross	Sept. 17, '83..	13 00	100 00	
Buctouche	H. Hutchison	Apr. 17, '97..	7 50	100 00	
Campbellton	G. E. Asker	May 5, '04..	150 50	200 00	
Capobello	W. S. Sulis	Dec. 16, '92..		100 00	
Cape Tormentine	M. S. Treene	May 13, '01..	30 00	200 00	
Caraget	J. A. Albert	Nov. 7, '05..	8 00	150 00	
Chatham	R. J. Walls	Apr. 13, '98..	206 00	300 00	
Cocagne	T. Bourque	June 23, '05..	50	100 00	
Dalhousie	W. S. Smith	Mar. 19, '88..	88 00	200 00	
Dorchester	J. Shea	Oct. 25, '00..	3 00	200 00	
Fairhaven	A. Calder	July 30, '01..	13 00	200 00	
Grand Manan North	J. E. Caskell	Mar. 20, '07..	10 00	100 00	
Grand Harbour	T. Ingalls	Apr. 19, '07..	7 50	100 00	
Gull Rock Channel	G. A. Johnson	Apr. 27, '04..		100 00	
Harvey	Wm. Wood	June 9, '03..	32 00	100 00	
Heron Channel	D. Robertson	July 15, '97..	22 50	200 00	
Hillsborough	J. O'Shaughnessy	Apr. 13, '98..	35 00	150 00	
Hopewell Cape	J. H. Christopher	"	28 50	200 00	
Ledge of St. Stephens	Wm. McBean	June 12, '94..		100 00	
Letete	H. W. Harris	Feb. 16, '06..	6 50	100 00	
Moncton	T. Coffey	Apr. 12, '02..	8 50	200 00	
Musquash	J. McNulty	Sept. 28, '96..	4 50	100 00	
Newcastle	J. Russell	June 27, '04..	120 50	300 00	
Port Elgin and Baie Verte	C. Trenholme	Apr. 3, '07..	2 50	200 00	
Richibucto	J. Jardine	May 11, '74..	23 00	200 00	
Sackville	E. Chase	May 11, '04..	14 50	200 00	
St. Andrews	Capt. R. Keay	Feb. 16, '09..	65 50	100 00	
St. George	G. W. McKenzie	May 10, '00..	30 00	100 00	
St. Martin and Quaco	J. R. McDonough	July 11, '02..	39 00	100 00	
Seal Cove	J. W. Wooster	Apr. 19, '07..	3 00	100 00	
Shediac	A. McQueen	May 19, '76..	20 00	300 00	
Shippegan	J. Degrace	Apr. 14, '03..	8 50	100 00	
Tracadie	T. Savoy	Sept. 23, '99..	6 00	100 00	
Waterside	W. C. Anderson	May 24, '01..	8 00	100 00	
West Isles	B. Simpson	May 27, '01..	14 00	200 00	
Whitehead	A. Cheney	Apr. 19, '07..	6 00	100 00	

PROVINCE OF NOVA SCOTIA.

Abbot's Harbour	F. D. Entremont	May 23, 1901.	4 50	200 00	
Advocate	J. W. Knowlton	Feb. 11, 1908.	7 00	100 00	
Amherst	F. A. Gates	April 3, 1907.	21 00	300 00	
Annapolis	J. Lindgren	July 7, 1898.	76 50	200 00	
Arichat	J. Langlois	Mar. 22, 1909.	22 00	200 00	
Baddeck	P. L. McFarlane	May 6, 1909.	Nil.	100 00	
Barrington	B. Kenny	July 6, 1893.	30 50	200 00	
Bear River	W. McFadden	Sept. 27, 1897.	27 50	100 00	
Beaver Harbour	H. Hawbott	" 22, 1888.	1 00	100 00	
Big Harbour	D. G. McKenzie	April 18, 1908.	0 50	100 00	
Bridgewater	W. Oakes	Jan. 28, 1896.	13 00	100 00	39 00
Big Bras d'Or	J. McLean	Aug. 13, 1903.	4 00	200 00	
Cape Canso	G. Oliver	Feb. 14, 1905.	77 50	150 00	
Cape Negro	A. D. Parry	May 18, 1881.	10 00	200 00	
Chester	A. C. Corkum	July 8, 1896.	16 30	100 00	
Cheticamp	F. Aucoin	April 15, 1876.	4 50	100 00	
Clark's Harbour	J. G. Nickerson		64 50	200 00	
Clementsport	J. M. LeCain	Oct. 18, 1898.	10 00	150 00	
D'Escousse	M. Martell	April 22, 1902.	9 50	100 00	
Digby	H. Anderson	June 19, 1902.	80 00	200 00	
Gabarus	J. W. Hardy	Nov. 2, 1886.	3 00	100 00	
Glasgow and Cape Breton Pier, Sydney	A. McQuarrie	Oct. 30, 1880.	33 00	300 00	

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TABLE showing names of ports, harbour masters, collections, salaries, &c.—*Continued.*PROVINCE OF NOVA SCOTIA—*Continued.*

Names of Port.	Harbour Masters.	Date of Appointment.	Amount Collected.	Remuneration Allowed.	Amount paid to Cr. R. G.
			\$ cts.	\$ cts.	\$ cts.
Guysboro.....	A. M. Peart.....	Feb. 11, 1902.	2 00	100 00	
Halifax.....	J. E. Butler.....	Sept. 21, 1893.	1,523 00	1,800 00	
Hantsport.....	W. McCallock.....	Jan. 17, 1892.	185 50	300 00	
Ingonish So. Bay.....	J. Doucett.....	April 30, 1901.	9 00	100 00	
Ingram River.....	E. Huntly.....	Jan. 19, 1907.	48 00	100 00	
Int. Pier, Sydney.....	M. J. Neville.....	Oct. 30, 1880.	421 50	300 00	121 50
Isaac's Harbour.....	T. D. Cook.....	June 18, 1900.	11 00	100 00	
Jeddore.....	E. Bakers.....	Dec. 3, 1903.	29 50	100 00	
Jordan Bay.....	F. Thorburn.....	May 11, 1901.	5 50	150 00	
Kelly Cove.....	J. Kenny.....	April 6, 1908.	0 50	100 00	
La Have or Getson's Cove	G. H. Zwicker.....	Feb. 26, 1875.	45 00	300 00	
L'Ardoise Upper and Lower.....	G. Burke.....	Aug. 29, 1884.	4 00	100 00	
Liscombe.....	L. Wilson.....	Feb. 20, 1900.	23 00	200 00	
Little Bras d'Or Lake, between McKay's Point and Grand Narrows....	D. J. Campbell.....	April 17, 1899.	Nil.	100 00	
Little Glace Bay.....	E. Douglas.....	May 8, 1884.	14 00	200 00	
Little Narrows to Cranberry Point.....	K. McLeenan.....	Nov. 1, 1897.	Nil.	100 00	
Liverpool.....	J. Ryan.....	Dec. 22, 1906.	162 50	200 00	
Lockeport.....	G. J. Locke.....	April 2, 1906.	Nil.	100 00	
Louisburg.....	H. C. Levate.....	Oct. 13, 1898.	333 00	200 00	
".....	J. Townsend, D.H.M.....	May 1, 1899.	.....	150 00	
Lunenburg.....	J. Loye.....	Dec. 10, 1896.	122 50	150 00	
Ma'ou.....	J. McInnis.....	July 11, 1900.	7 00	100 00	
Mahone Bay.....	A. Hyson.....	Feb. 18, 1908.	24 50	200 00	
McNair's Cove.....	R. McEachern.....	Mar. 8, 1875.	Nil.	150 00	
Marble Mountain.....	D. McDonald.....	July 26, 1892.	5 00	200 00	
Margaretsville.....	J. McGranaghan.....	May 29, 1906.	3 00	100 00	
Margaret's Bay.....	H. C. Garrison.....	Dec. 14, 1901.	3 50	100 00	
Margaree.....	M. A. Dunn.....	Mar. 6, 1909.	2 00	100 00	
Marie Joseph.....	C. Dixon.....	Feb. 2, 1907.	1 50	100 00	
Meteghan Hbr.....	J. McLair.....	Nov. 17, 1908.	2 50	100 00	
Meteghan River.....	L. A. Corneau.....	Resigned.....	.....	.....
Musquodoboit.....	T. Williams.....	May 31, 1905.	5 50	100 00	
Neil's Harbour.....	R. Payne.....	July 15, 1905.	4 50	100 00	
Noel.....	S. O'Brien.....	Oct. 26, 1905.	4 50	200 00	
Northport.....	J. Davis.....	Dec. 21, 1902.	37 50	100 00	
Parrsboro.....	R. T. Smith.....	April 30, 1892.	164 50	300 00	
Petit de Grat.....	S. Boudrot.....	June 5, 1895.	12 00	200 00	
Petite Riviere Bridge.....	J. Nelson.....	April 27, 1888.	2 00	100 00	
Port Greville.....	J. Graham.....	April 27, 1909.	25 00	200 00	
Port Hastings.....	G. L. McLean.....	Feb. 15, 1908.	98 00	200 00	
Port Hood.....	J. H. Murphy.....	July 9, 1875.	2 50	200 00	
Port Latour.....	W. Sholds.....	Feb. 15, 1898.	18 50	200 00	
Port Lorne.....	F. Beardsley.....	June 9, 1896.	2 50	200 00	
Port Maitland.....	J. Ellis.....	Dec. 10, 1896.	5 50	200 00	
Port Morien.....	H. McDonald.....	Mar. 3, 1879.	29 50	400 00	
Port Mulgrave.....	J. A. McDonald.....	June 29, 1908.	6 00	200 00	
Port Medway.....	J. Hopkins.....	Feb. 13, 1903.	22 50	200 00	
Pubnico.....	D. Q. Amireau.....	Sept. 27, 1882.	44 00	100 00	
Port Wade.....	J. McWhinnie.....	Oct. 14, 1907.	17 50	200 00	
Pugwash.....	G. N. Allen.....	May 15, 1907.	30 50	100 00	
River Port.....	T. J. C. Creaser.....	Jan. 8, 1901.	34 00	100 00	
Riviere Bourgeoise.....	E. C. Bouchie.....	April 9, 1886.	7 50	100 00	
River Herbert.....	W. Y. Theal.....	July 24, 1903.	10 50	100 00	
St. Ann's Bay.....	G. E. Fader.....	Sept. 21, 1906.	8 00	200 00	
St. Ann's Hbr.....	A. McLeod.....	April 16, 1909.	24 00	200 00	
St. Mary's River.....	R. Quinn.....	June 21, 1909.	24 50	200 00	
St. Peter's.....	P. McNeil.....	Sept. 17, 1883.	79 00	200 00	
Sambo.....	B. Smith.....	May 27, 1890.	21 00	200 00	
Sheet Harbour.....	H. Hall.....	April 11, 1893.	.....	200 00	
Shelburne.....	J. C. Morrisson.....	May 4, 1897.	192 00	200 00	
Ship Harbour.....	C. Marks.....	June 2, 1884.	20 50	100 00	
Spencer's Island.....	D. McLellan.....	May 23, 1899.	6 00	100 00	

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TABLE showing names of ports, harbour masters, collections, salaries, &c.—*Continued.*
 PROVINCE OF NOVA SCOTIA—*Concluded.*

Names of Port.	Harbour Masters.	Date of Appointment.	Amount Collected.	Remuneration Allowed.	Amount paid to Cr. R. G.
			\$ cts.	\$ cts.	\$ cts.
Tangier.	C. A. Hilchey	Nov. 14, 1901.	10 50	200 00	
Tatamagouche.	W. Rielley	June 1, 1900.	1 00	200 00	
Tiverton.	J. Blackford	April 3, 1900.	5 00	100 00	
Torbay.	S. Fougere	Aug. 25, 1903.	14 50	200 00	
Tusket.	C. Doucette	Nov. 21, 1902.	10 00	100 00	
Tusket Wedge.	J. LeBlanc.	May 16, 1901.	39 00	100 00	
Wallace.	S. D. Potton.	Feb. 14, 1896.	2 00	100 00	
Walton.	B. McCulloch.	Oct. 26, 1905.	24 50	200 00	
West Arichat.	A. B. Poirier.	Oct. 9, 1896.	13 50	100 00	
West Port.	G. Welsh	Jan. 29, 1899.	33 00	200 00	
Weymouth.	S. McCormack.	May 29, 1897.	61 00	200 00	
Whycocomagh.	N. McKinnon.	Oct. 8, 1875.		100 00	
Wolfville.	J. L. Franklin.	Aug. 16, 1901.	13 00	100 00	
Woods Harbour.	S. K. Woods	Feb. 19, 1892.	30 50	200 00	
Yarmouth.	E. Scott	Oct. 19, 1877.	200 00	250 00	

PROVINCE OF PRINCE EDWARD ISLAND.

Alberton.	J. Kinch.	July 30, 1901.	2 50	200 00	
Charlottetown and Hills-boro River.	J. White.	Mar. 6, 1909.	134 50	400 00	
Crapaud.	W. Myers.	June 17, 1874.	2 50	200 00	
Egmont Bay.	G. Henry	Dec. 5, 1906.	1 50	200 00	
Georgetown.	J. Westaway	May 16, 1904.	23 75	200 00	
Malpeque.	J. Champion.	Dec. 10, 1896.	1 00	200 00	
Minegash.	P. Doucette.	Jan. 21, 1908.	2 50	100 00	
Montague Bridge.	H. McPherson	May 5, 1904.	9 50	200 00	
Murray Harbour.	G. McLeod.	Jan. 19, 1907.	3 50	200 00	
Murray River.	G. McLeod.	Feb. 9, 1897.	3 50	200 00	
New London.	W. Bell.	Aug. 25, 1896.	4 00	200 00	
Pinette.	J. D. McDonald.	Oct. 22, 1903.	1 50	100 00	
Souris East and West.	J. Tierney	May 15, 1905.	50 50	200 00	
Summerside.	J. Matheson	Feb. 8, 1907.	30 50	200 00	
Vernon River Bridge.	J. Finlay.	Oct. 9, 1884.	0 50	200 00	
Wood Island.	J. Young	May 22, 1899.	Nil.	100 00	

PROVINCE OF BRITISH COLUMBIA.

Chemainus.	L. G. Hill.	Mar. 2, 1887.	70 50	200 00	
Comox.	G. H. Rowe.	April 25, 1856.	339 00	200 00	139 00
Ladysmith.	W. Fraser.	May 29, 1906.	201 00	200 00	1 00
Nanaimo Departure Bay.	J. Knarston.	Oct. 26, 1905.	597 50	500 00	97 50
New Westminster.	W. B. Shiles	Feb. 15, 1908.	116 50	400 00	
Snug Harbour.	R. Kellahne.	Mar. 2, 1903.	3 50	200 00	
Vancouver.	D. A. McInnis.	Jan. 22, 1909.	607 00	600 00	7 00
Victoria and Esquimalt.	C. E. Clarke.	Nov. 3, 1894.	596 00	600 00	

RECAPITULATION.

Province.	Number of Ports.	Amount Collected.	Amount paid to Cr. R. G.
		\$ cts.	\$ cts.
Ontario.	18	2,037 00	120 75
Quebec.	25	1,844 00	281 00
New Brunswick.	38	1,097 00	
Nova Scotia, including Halifax.	98	5,048 50	121 50
Prince Edward Island.	16	271 75	
British Columbia.	8	2,533 00	244 50
Total.	203	12,831 25	767 75



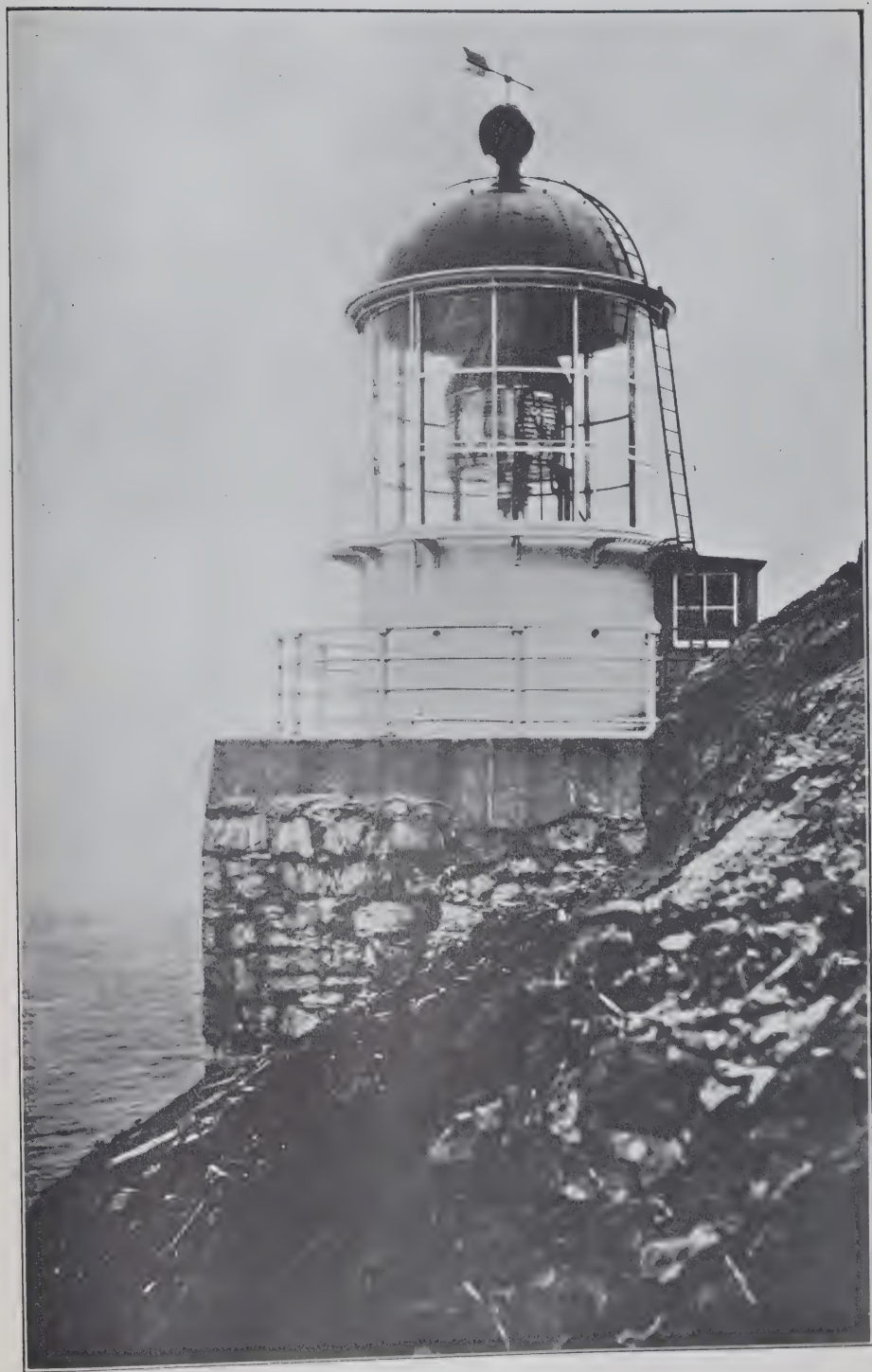
Cape Ray Lighthouse, Newfoundland.



North end of Belle Isle Light Station.



Reinforced Concrete Lighthouse at North end of Belle Isle.



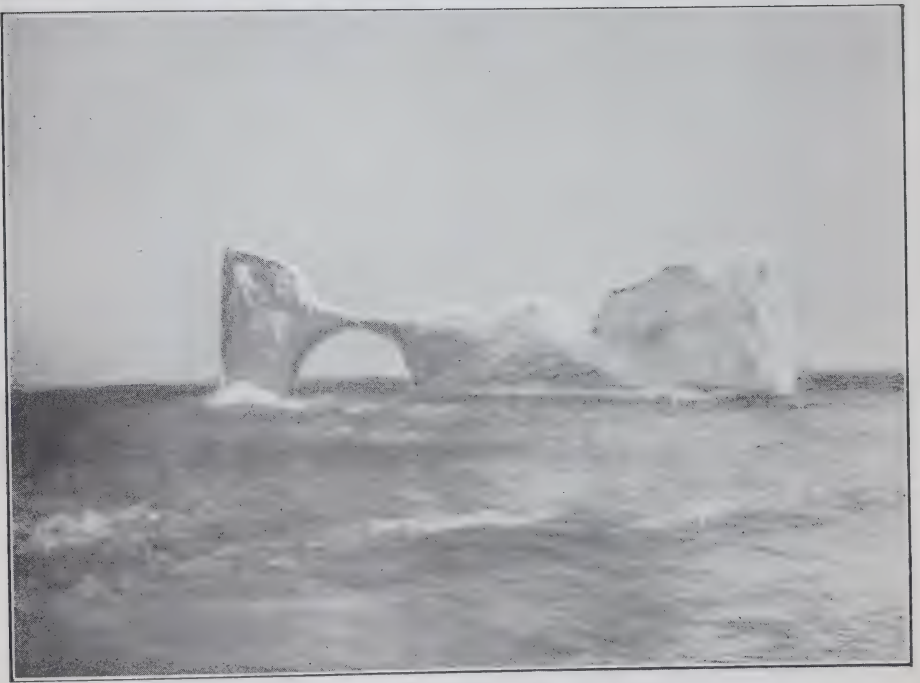
Low Light on South End of Belle Isle.



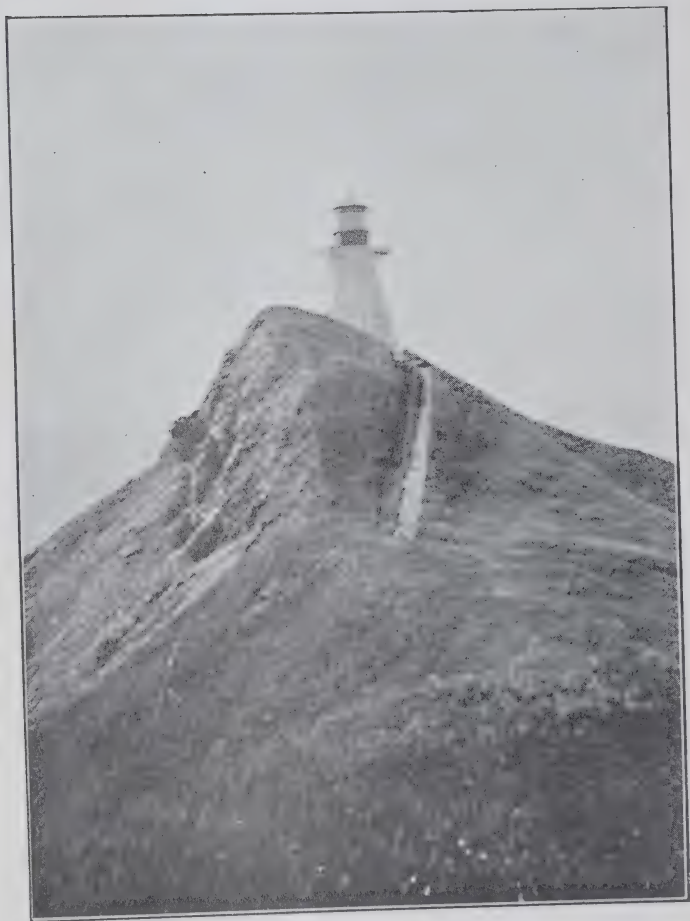
Fishing Schooners moored in Black Joke Cove, Belle Isle.



Iceberg in Strait of Belle Isle.



Iceberg in Strait of Belle Isle.



Entry Island, Magdalen Islands, Lighthouse.



Cape Dogs, Que., Lighthouse.



Little Metis Station, Que., showing New Concrete Lighthouse Tower.



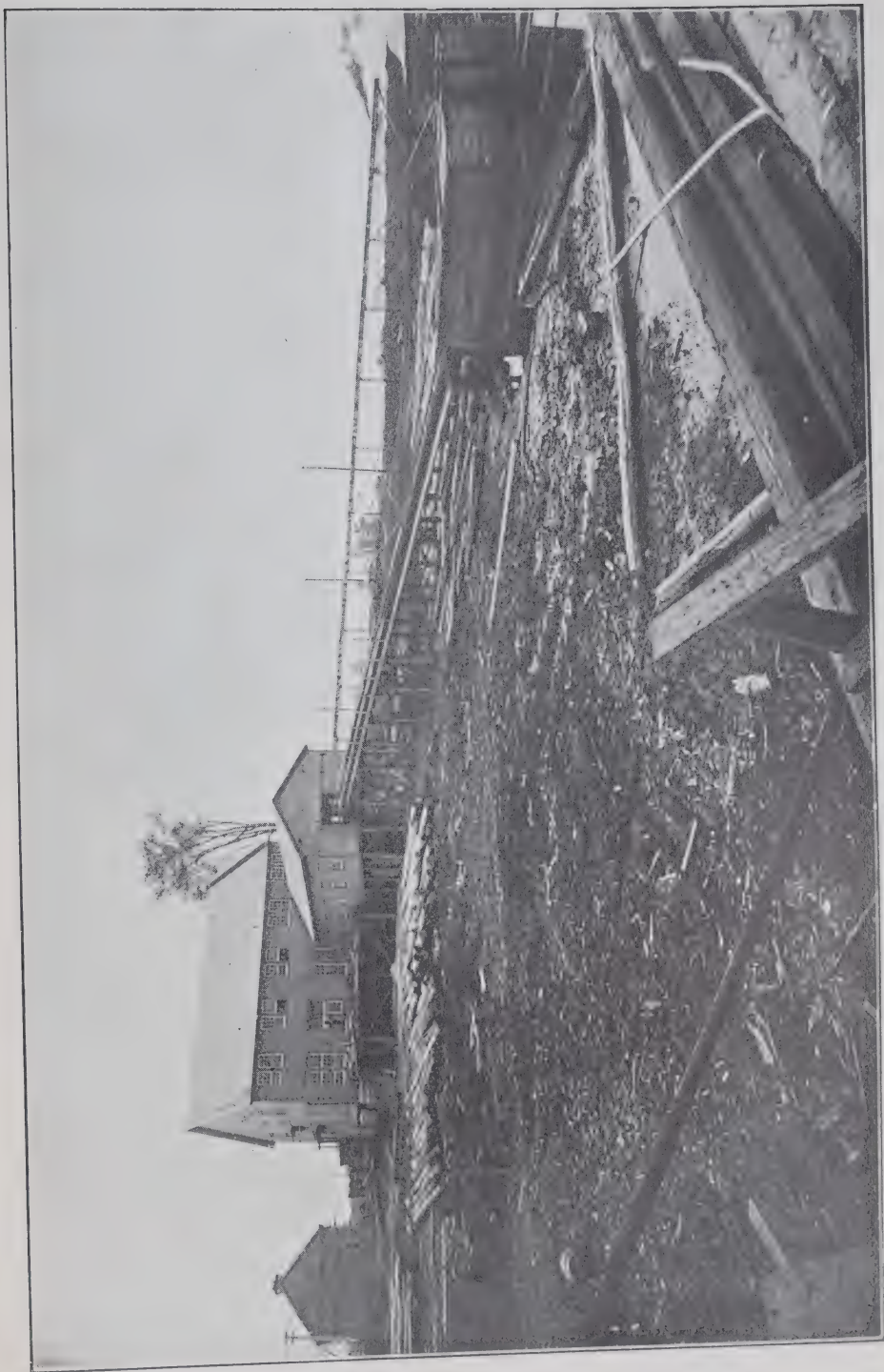
Ste. Anne de Beaupré, Quebec, Front Range Lighthouse.



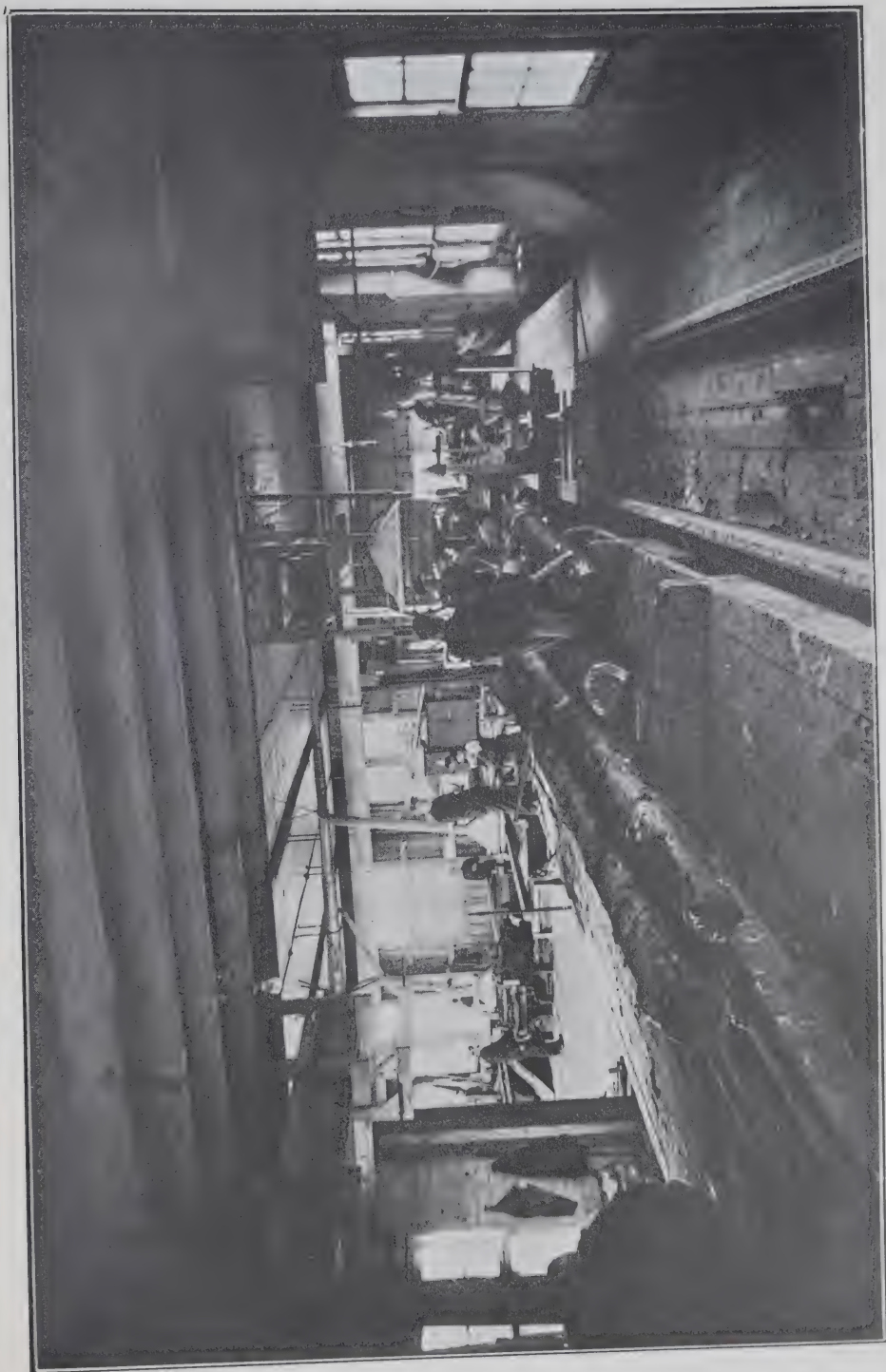
St. Pancras Point Lighthouse, Quebec.



Government Shipyard, Sorel, machine shop and blacksmith shop.



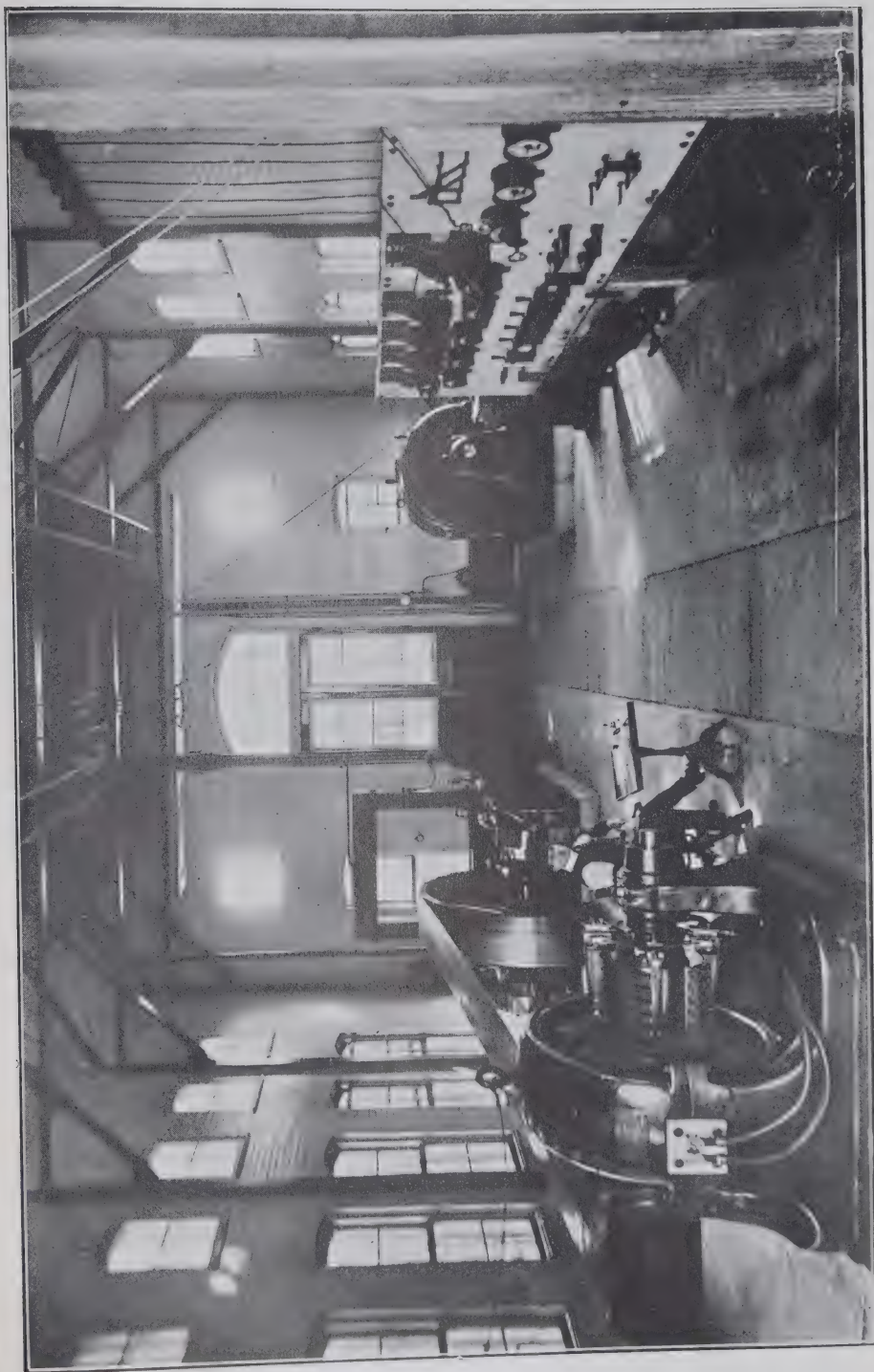
Sawmill, Government Shipyards, Sorel.



Interior of Sawmill, Sorel Government Shipyards.



Power House, Government Shipyard, Sorel.



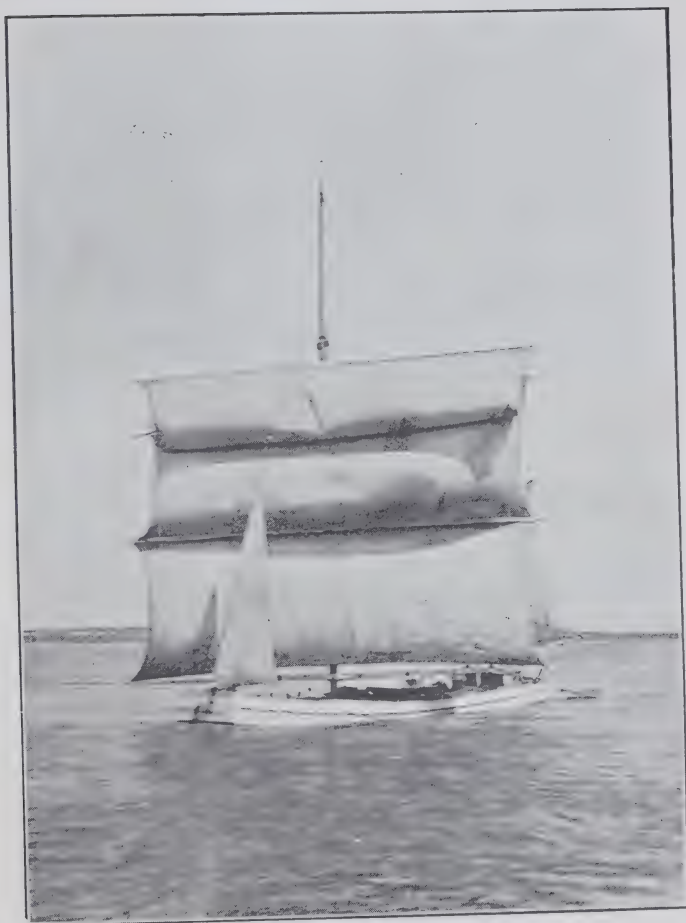
Interior of Power House, Government Shipyard, Sorel.



The new C. G. Steamer "Lambton" ready for launching at the Government Shipyard, Sorel.



C. G. Steamer ' Montmagny ' under construction at Sorel Government Shipyard.



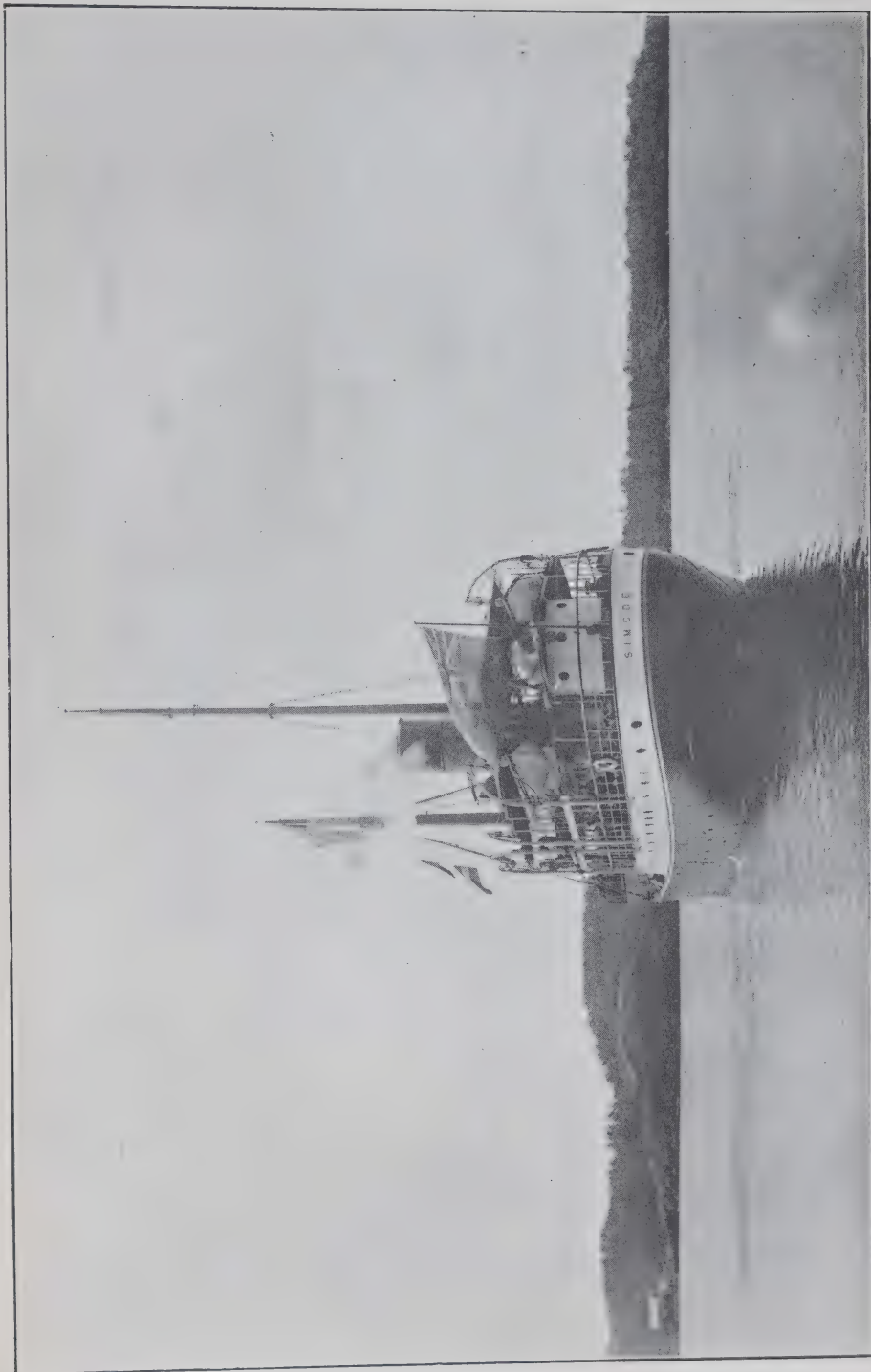
Pin Platte on Lake St. Peter, St. Lawrence River.



New Steamer "Lambton" for Lighthouse Construction on the Great Lakes.



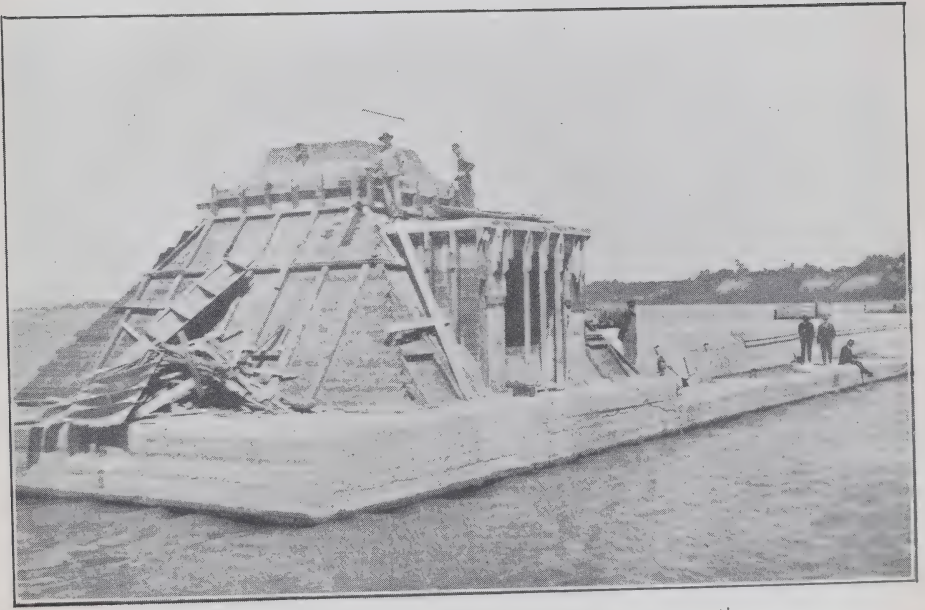
New Steamer "Lambton" for Lighthouse Construction Service, Great Lakes.



New Steamer "Simcoe" employed in lighthouse supply and buoy service on the Great Lakes.



New Steamer "Simcoe" employed in Lighthouse Supply and Buoy Service on the Great Lakes.



Port Stanley, Ont., Concrete Lighted Beacon under construction.



Colchester Reef, Ont., Lighthouse.



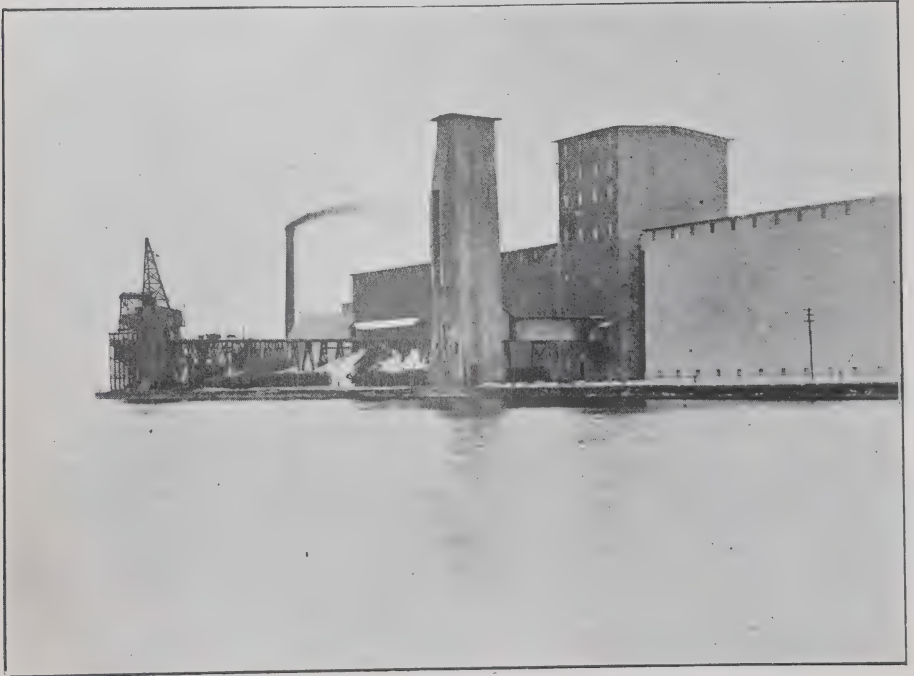
Owen Sound, Ont., Back Range Lighthouse.



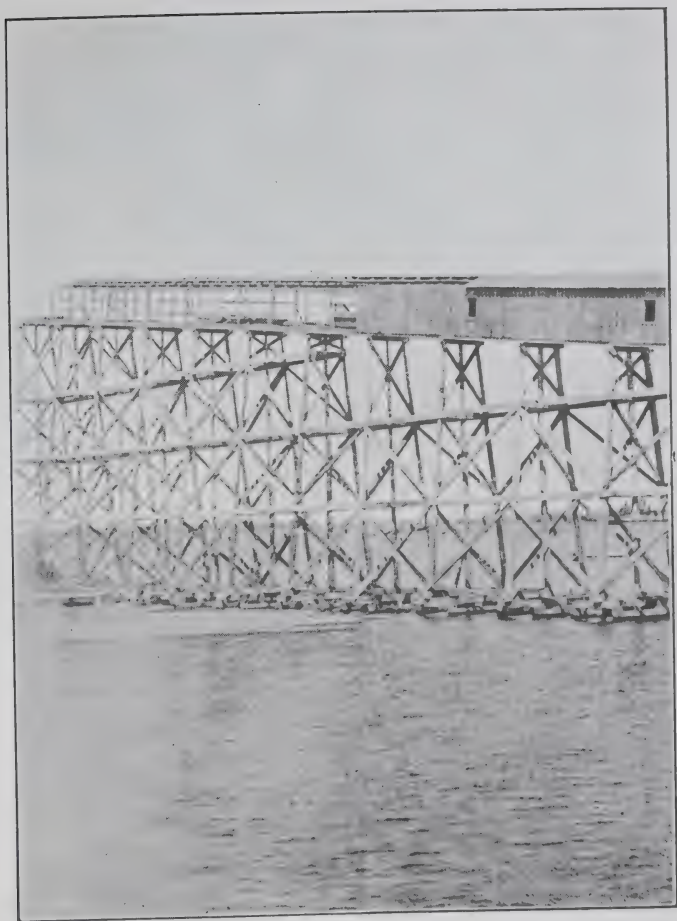
Point Edward, Ont., Front Range Lighthouse under construction.



Stag Island Shoal Lighthouse, St. Clair River, Ont.



Grand Trunk Elevator, Depot Harbour, Ont.



Canadian Northern Railway, Iron Ore Trestle, Key Inlet, Georgian Bay.



Entrance to Port Stanley, Ont.



Port Stanley, Ont., site for Concrete Lighted Beacon.



Triangle Island, Cape Scott, B.C.

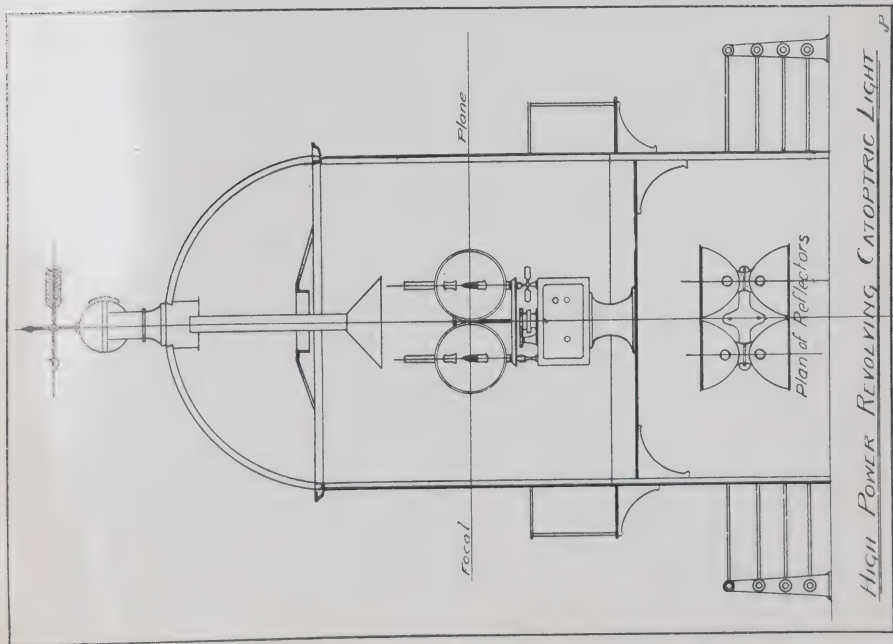


Plate 1.

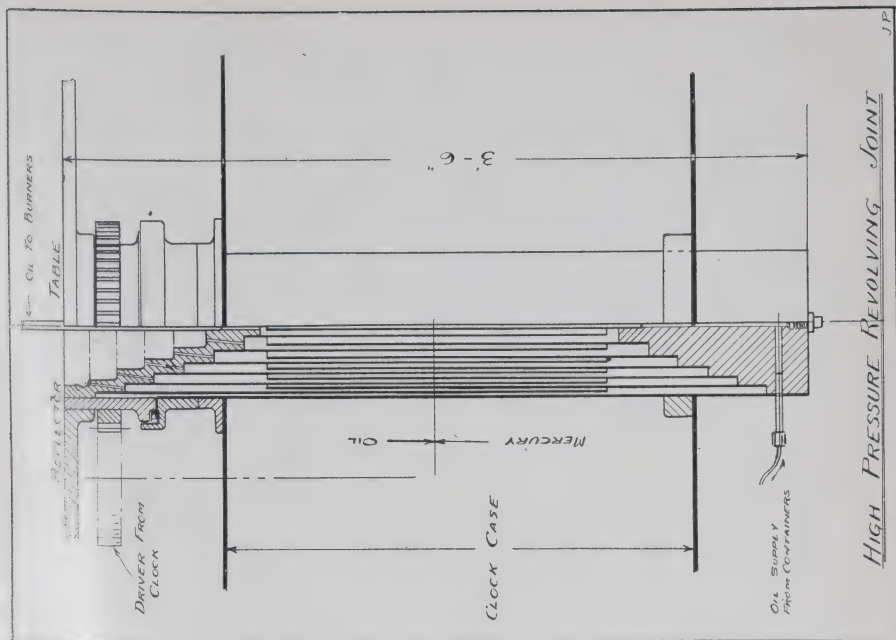
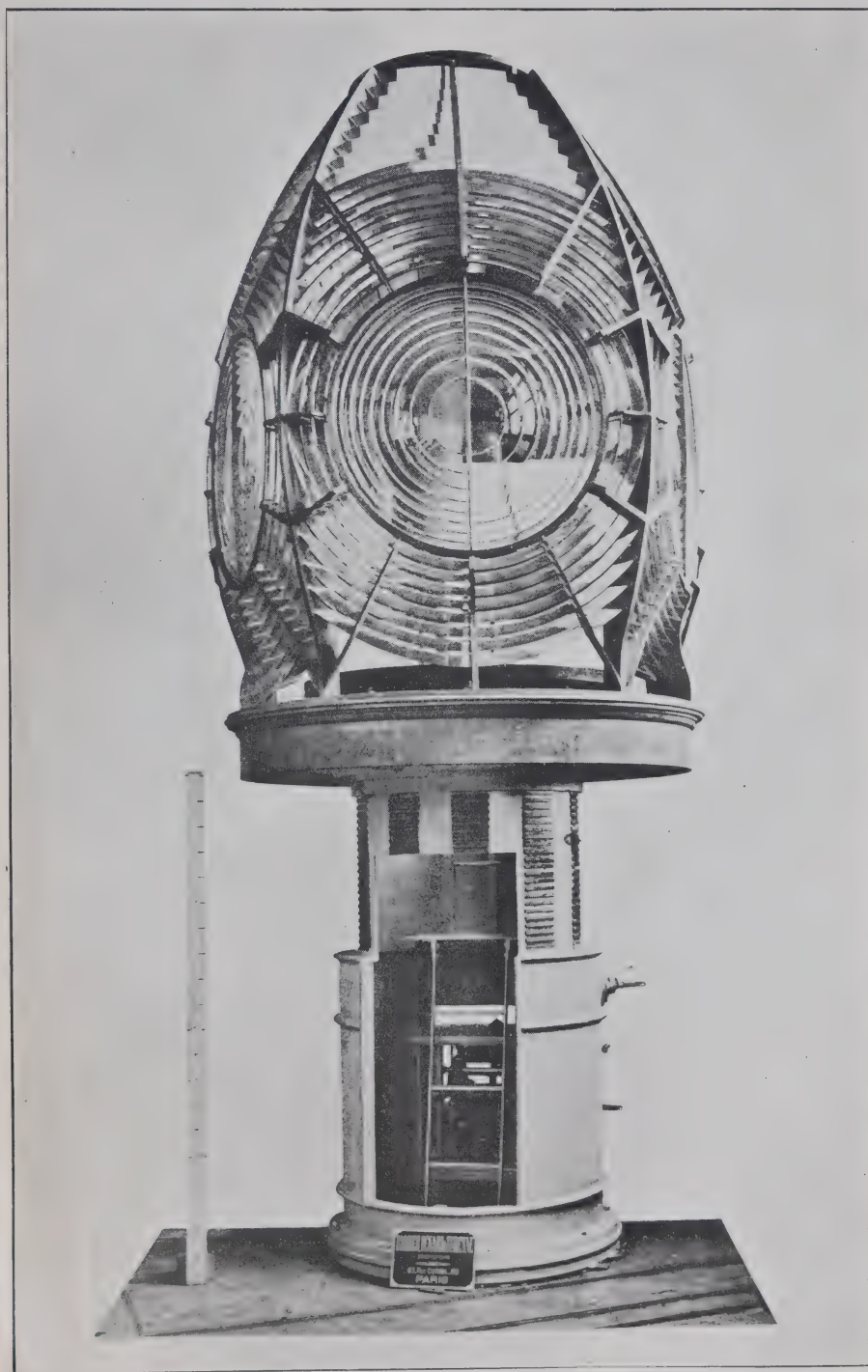


Plate 2.



First Order Lighting Apparatus, Cape Ray Lighthouse, Nfld., maintained by Dominion Government.

